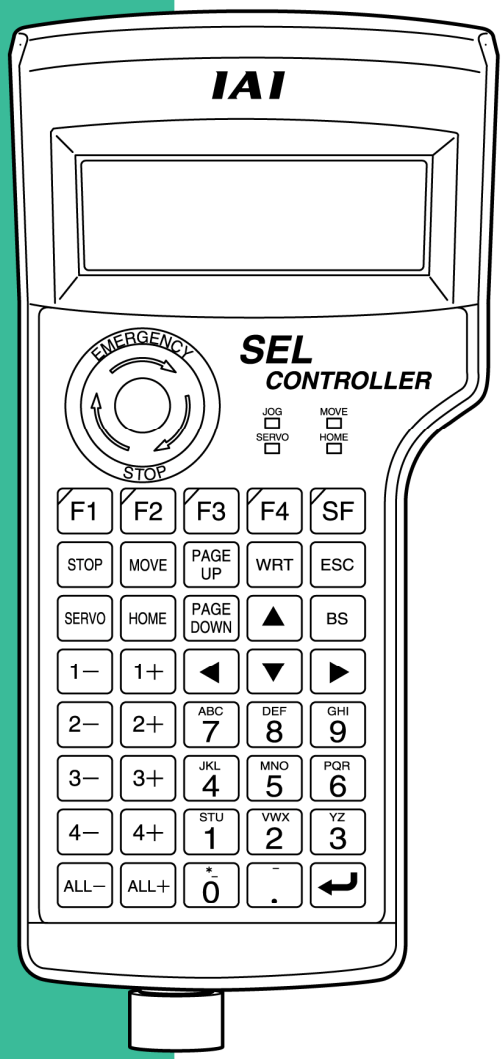
SEL
CONTROLLER

SEL CONTROLLER
Teaching Pendant
SEL-T, SEL-TD

Operating Manual Ver. 1.0



IAI Corporation

Support Models

Model Name	Support Started Version
X-SEL-K	V1.00
X-SEL-KX	V1.00
X-SEL-P/Q	V1.00
TT	V1.00
X-SEL-PX/QX	V1.00
SSEL	V1.00
ASEL	V1.00
PSEL	V1.00

1. Forward

Thank you very much for purchasing our X-SEL, TT, SSEL, ASEL and PSEL Controller Teaching Pendant. Improper usage or mishandling may result in a product not only being unable to deliver full functions but also produce unexpected troubles or shorten the product's life. Please read this Manual carefully, and operate the product properly by paying attention to its handling. When operating the Teaching Pendant, always keep this Manual at hand and read the relevant items as required.

For the actuator and controller to be used, be sure to refer to the Instruction Manuals attached to the products.

- While the teaching pendant is left connected, "Effect" is valid for the safety velocity. Therefore, in the case of the orthogonal axis, the maximum velocity is 250 mm/sec or lower when the program is started from the teaching pendant. In the case of the SCARA axis, the maximum velocity is 250 mm/sec or lower for CP motion and 3% or less for PTP motion. To operate the controller according to the program velocity command, it is required to change the condition to "No Effect."

  For selection of the safety velocity between Effect and No Effect, refer to "18-8. Safety Velocity."

- The display screens of this manual are of version 1.00 or later of the teaching pendant application. To confirm the version, refer to the section "17-9. Version Information."

2. Before Use

(1) Be sure to read this Instruction Manual for proper use of this product.
(2) Part or all of this Instruction Manual may not be used or reproduced without permission.
(3) For any handling and operating methods other than those described in this Instruction Manual, interpret them as "don't" or "can't."
(4) Please note that we shall not be liable for any effects resulting from using this Instruction Manual.
(5) Descriptions in this Instruction Manual are subject to change due to product improvements etc., without prior notice in the future.

3. Safety Precautions ⚠

(1) Use a genuine product specified by us for wiring between the actuator and X-SEL Controller.

(2) Keep out of the operating range of a machine such as an actuator while it is operating or in a ready state (condition in which the controller's power is ON). When using it in places where persons may approach, fence it off.

(3) Before carrying out assembly and adjustment work or maintenance and inspection work of the machine, be sure to disconnect the power cord. While working, display the plate specified as such at an easy-to-read location. In addition, give special consideration to prevent third parties from turning on the power carelessly by hauling in the power cord to the operator. Alternatively, lock the power plug or receptacle and direct the operator to keep the key or prepare a safety plug.

(4) When more than one operator works, advance work by determining the signal method and checking each other's safety. Especially, for work associated with axial movement regardless of power ON/OFF or motor-driven/manual operation, be sure to confirm safety by calling out to other(s) in advance.

(5) When the user (customer) extends wiring, malfunction may occur due to faulty wiring. In this case, inspect wiring thoroughly and check it for properness before turning on the power.

4. Warranty Period and Scope of Warranty

The Teaching Pendant you purchased has been delivered upon completion of our strict shipping test.

We shall warrantee this product as follows.

1. Warranty Period

The warranty term shall be either of the following terms, whichever is reached first.

- 18 months after our shipment
- 12 months after delivery to the place designated by you

2. Scope of Warranty

Where a defective condition occurs during proper use conditions and obviously under the responsibility of the manufacturer, within the term above, we shall repair the product without charge. However, any items that apply to the following are excluded from the warranty coverage.

- Defects resulting from changes over time such as natural color fading of paint
- Defects resulting from use wear of consumable parts (such as a cable)
- Defects resulting from sensory phenomena such as generated noise that have no functional effects
- Defects resulting from mishandling or improper use
- Defects resulting from an inadequacy or error in maintenance and inspection
- Defects resulting from the use of any part other than our genuine parts
- Defects resulting from a modification not approved by us or our dealers
- Defects resulting from Acts of God, accident, fire, etc.

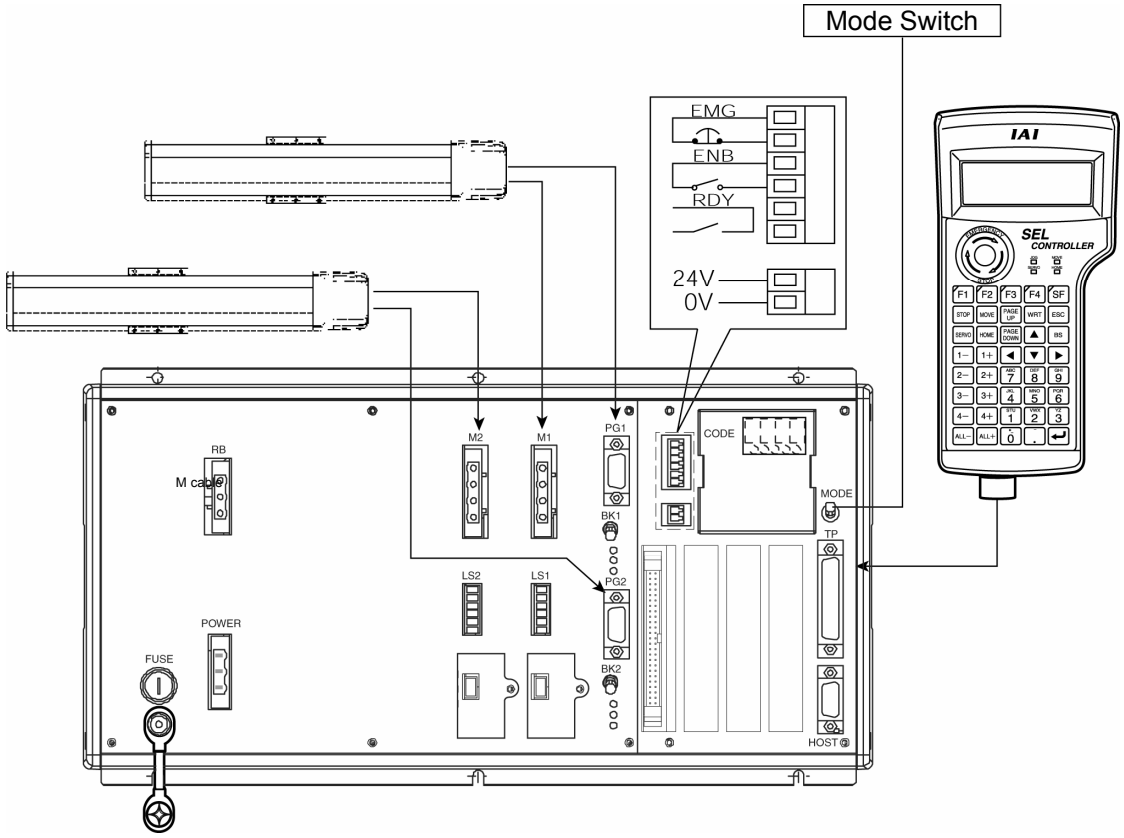
Only a delivered product shall be singly warranted, and no damage induced by the defect of the delivery product can be warranted. For repair, transport the product to our factory.

3. Service Coverage

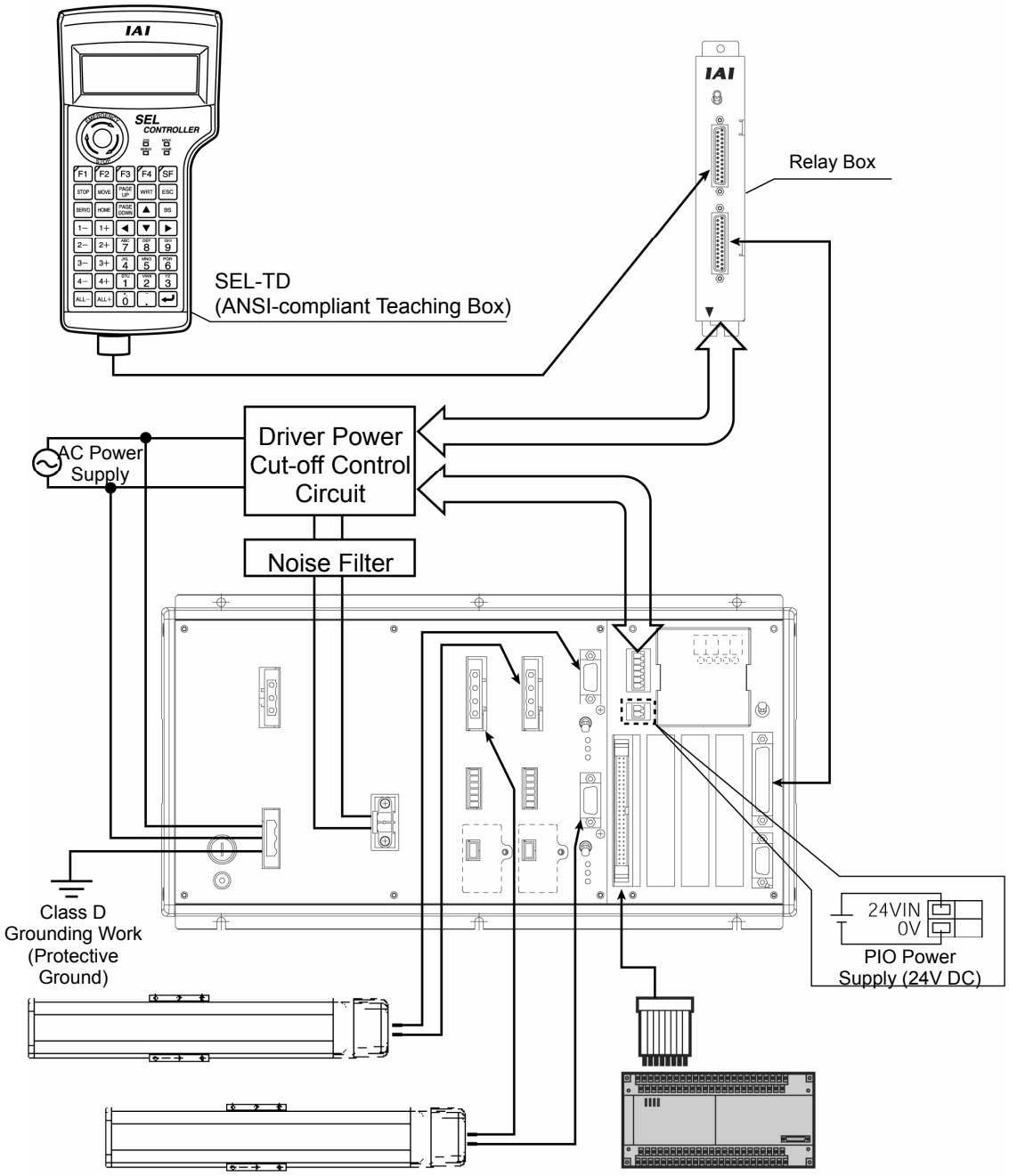
The cost of a delivered product does not include expenses for program creation and engineer dispatching. Therefore, the following are charged separately even within the warranty term:

- Maintenance and inspection
- Technical guidance and technical training in operating instructions
- Technical guidance and technical training on program-related matters such as program creation

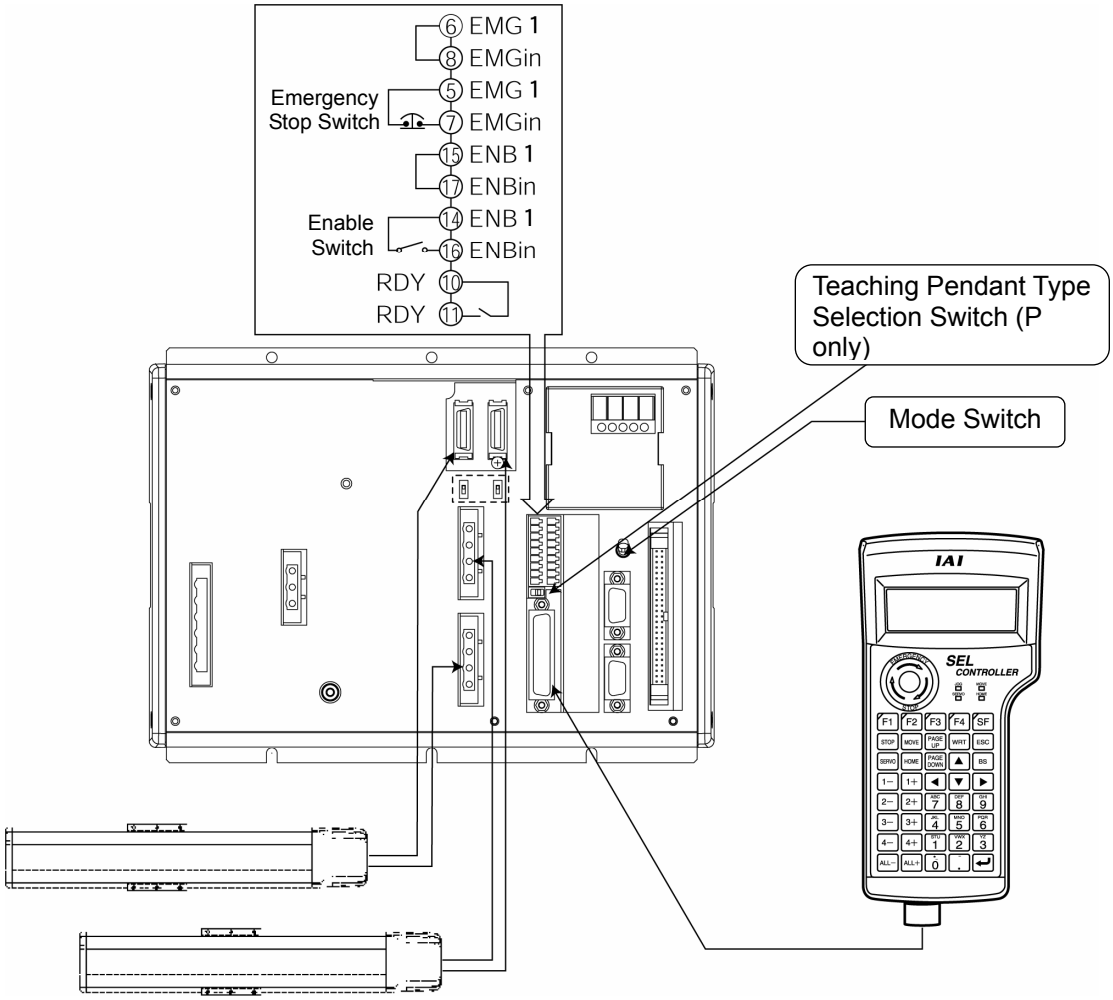
5. Connection to Controller



X-SEL-K Type Controller



Example of Connection to X-SEL-KT/KET Type Controller



X-SEL-P (Q) Type Controller

Caution

- Set the teaching pendant type selection switch of the X-SEL-P type to the left.

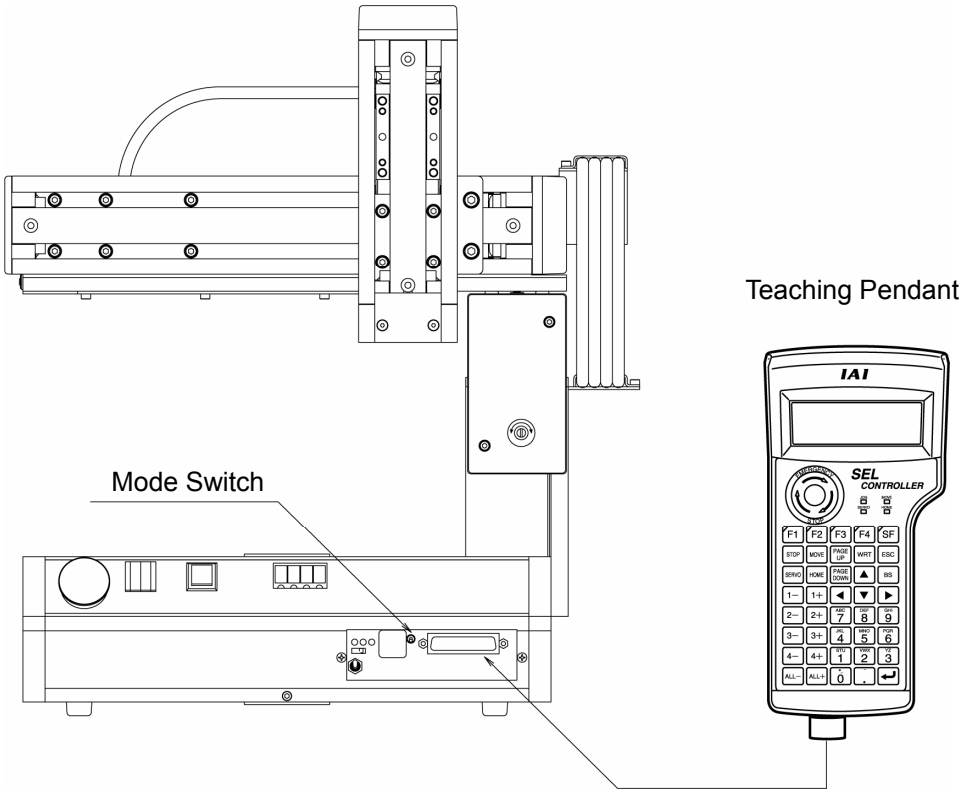
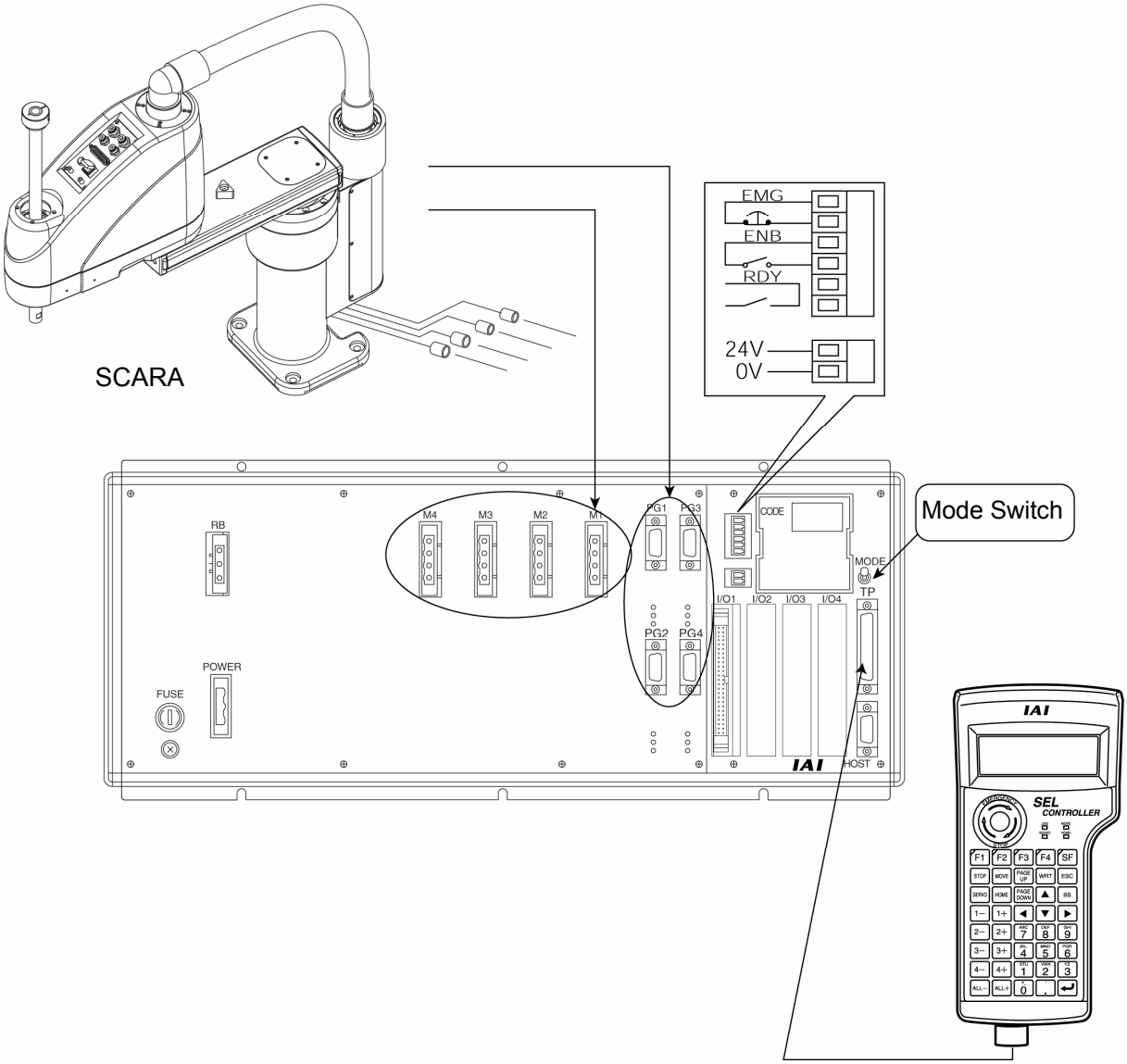
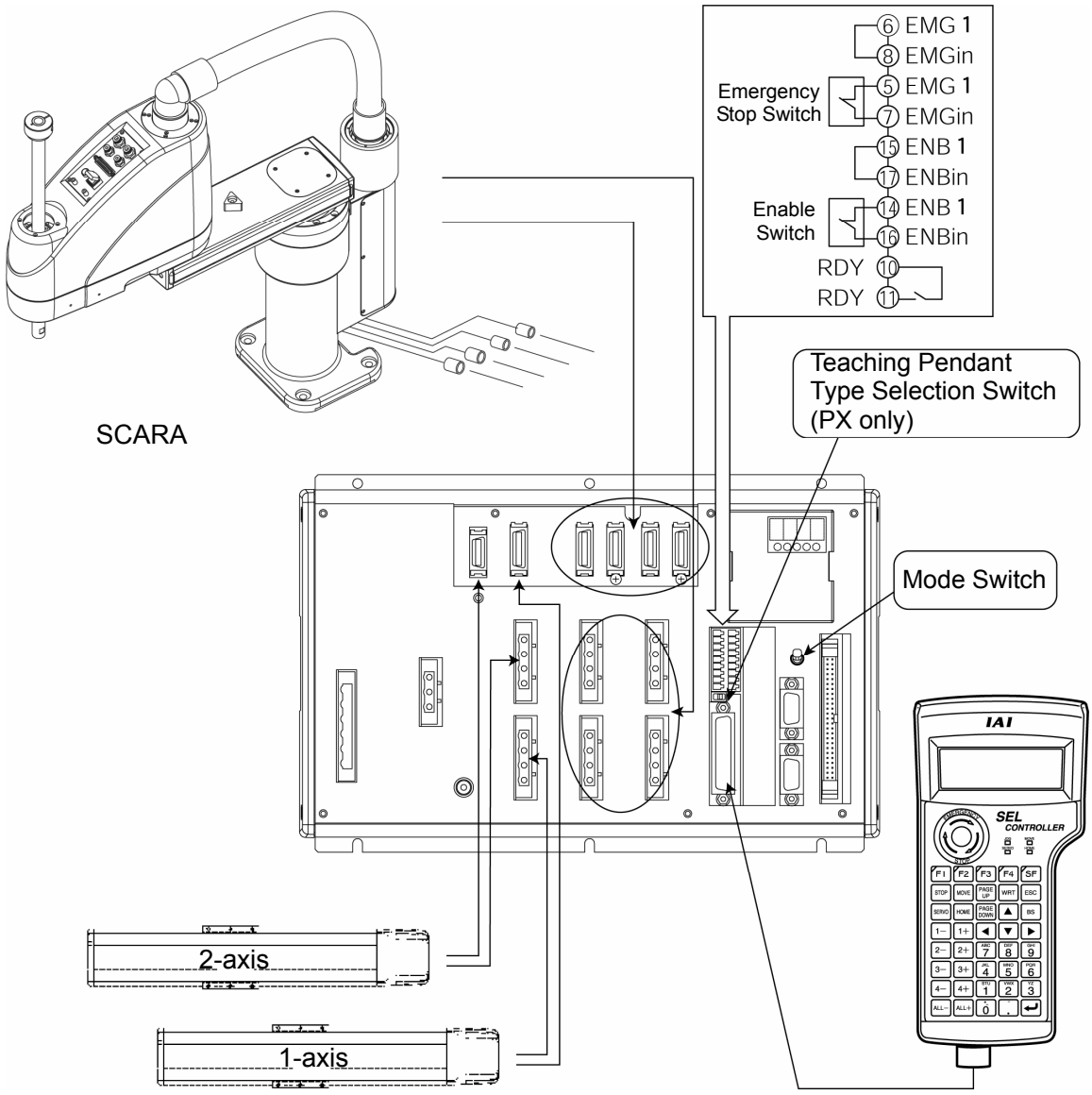


Table Top Actuator (TT)



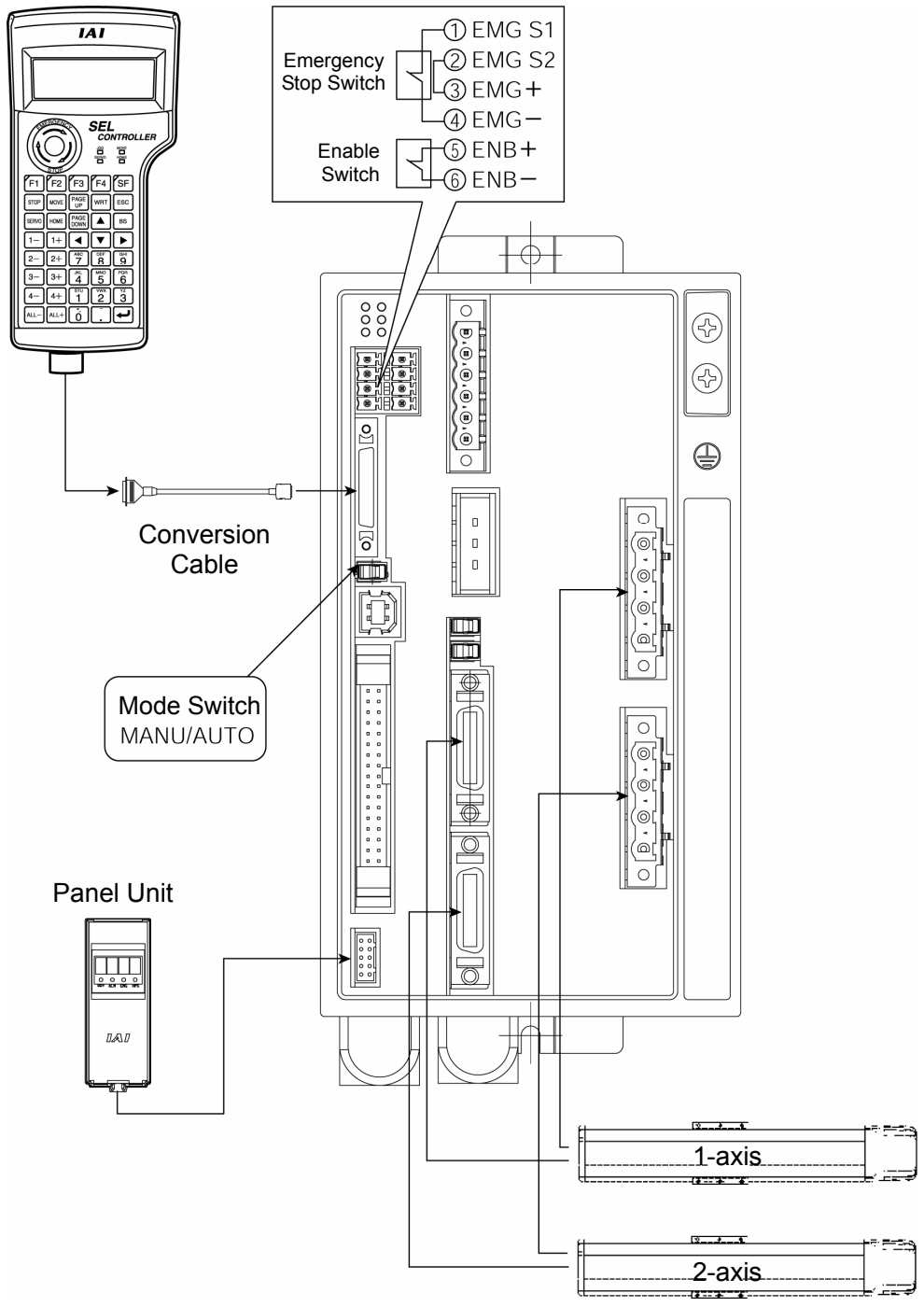
X-SEL-KX Type Controller



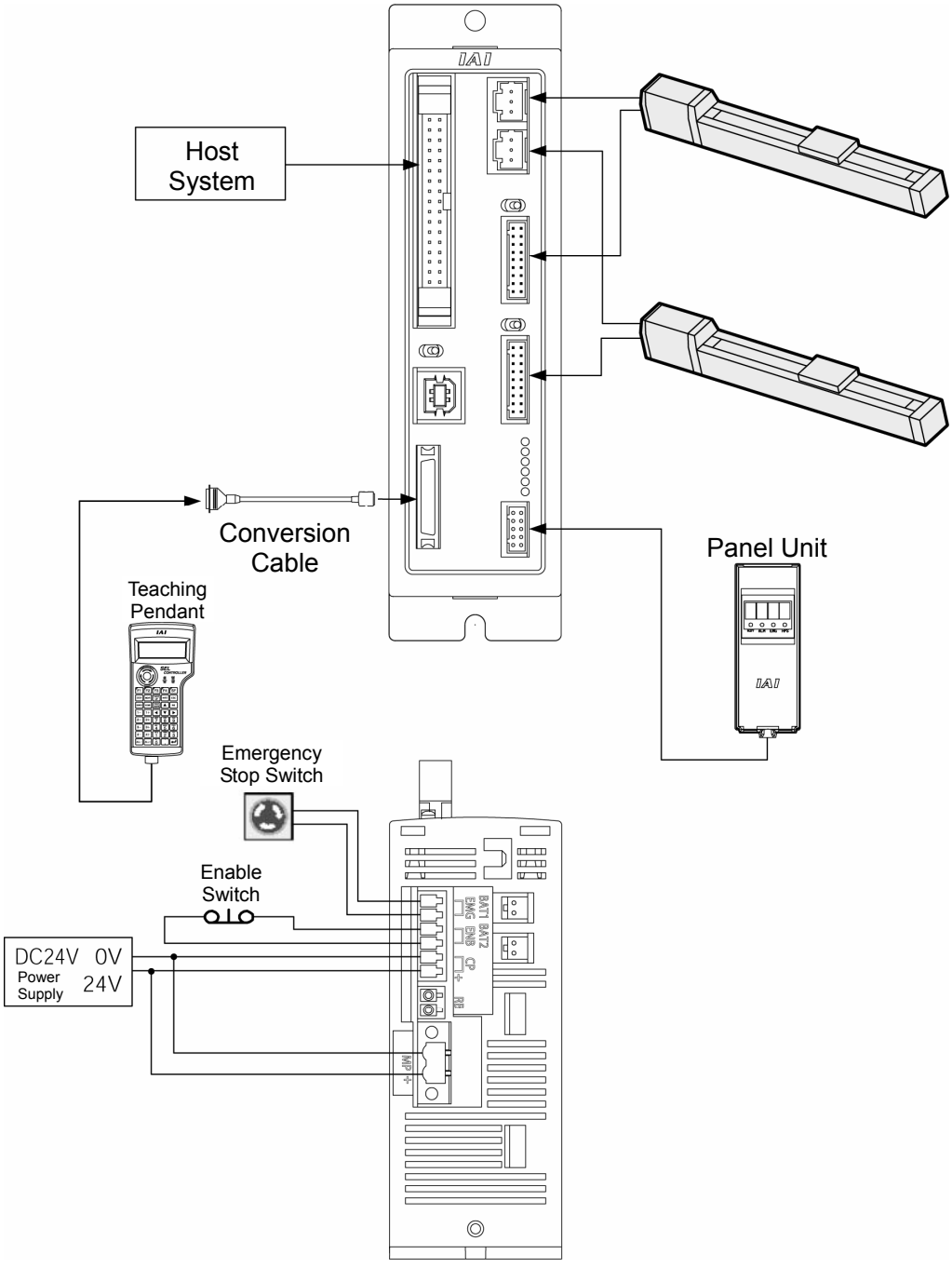
X-SEL-PX (QX) Type Controller

Caution

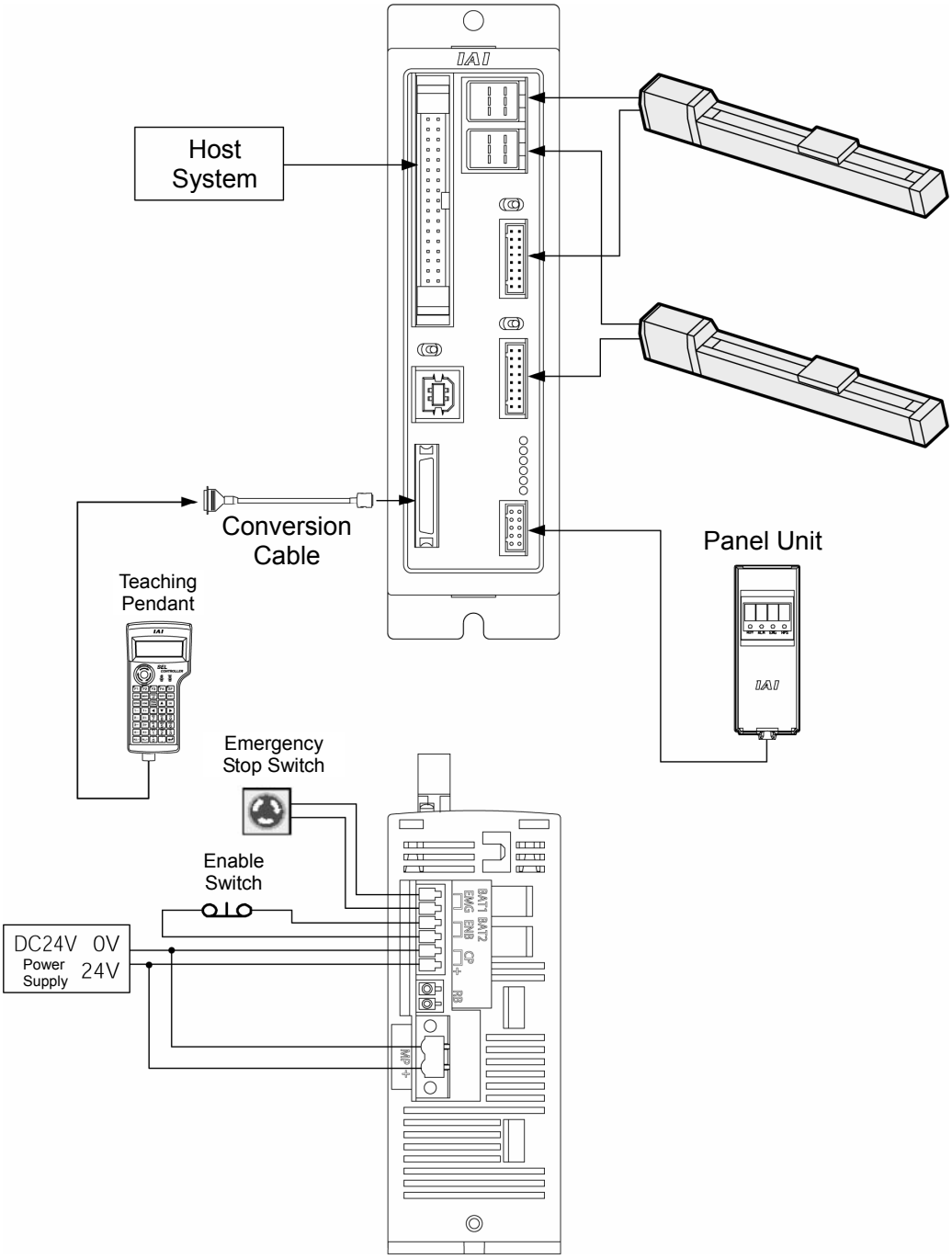
- Set the teaching pendant type selection switch of the X-SEL-PX type to the left.



SSEL Type Controller



ASEL Type Controller



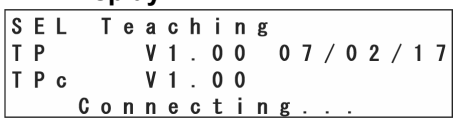
PSEL Type Controller

1. Connect actuators, I/O 24VDC power source, and system I/O to the controller first. Then connect the cable connector of the teaching pendant to the controller's teaching connector when the main power supply of the controller is OFF.

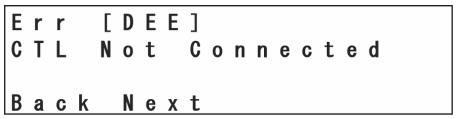
2. After you flip the mode switch to MANU side, supply power to the controller.

Teaching Pendant

LCD Display

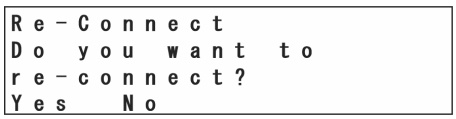


Displays the version of the teaching pendant and moves to the following page, the mode selection screen.



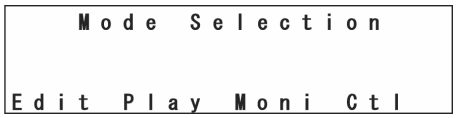
If the mode is switched to AUTO side, the teaching pendant does not connect to the controller and the screen on the left will be displayed. Press ESC key and make it reconnected.

Re-connection Screen



Turn on the mode switch to MANU side and press the F1 (Yes) key to execute re-connection.

Mode Selection Screen



This is the basic screen for all operations.

Extra Caution

When the X-SEL controller K type executes “OPEN 1” (channel 1 shared for the teaching pendant) within the SEL program in the MANU (manual) mode, the right of use of the serial port channel 1 is forcefully moved to the SEL program and communication with the teaching pendant is disconnected. The program in the controller is running. (*Error No. A5D “SCIF open error non-auto mode”)

Afterwards, if you wish to stop movement, press ON the Emergency Stop Button (Be especially careful during Jog operation).

*In a case prior to Ver 0.16 of controller main application.

For the controller P/Q type as well as the K type with the controller main application ver. 0.16 or later, the following are applied regarding OPEN of the TP port (teaching connector) according to the servo not in use or in use:

<MANU mode, servo not in use>

	Before execution of OPEN	After execution of OPEN
Connection of TP port	Connection to Teaching Pendant	Forced movement to SEL program connection (Message error) Program is executing

Error occurring after OPEN command execution: Error No. A50 “SCIF open error during non-AUTO mode”

<MANU mode, servo in use>

	Before execution of OPEN		After execution of OPEN
Connection of TP port	Connection to Teaching Pendant	⇨	Connection to Teaching Pendant (Cold start error) Program is ending

Error occurring after OPEN command execution: Error No. E.89 “SCIF open error during non-AUTO mode (servo ON)

The channel No. of the TP port varies according to the controller’s type.

K type, KX type, and Table Top Actuator (TT): 1 ch “OPEN 1”

P/Q type, PX/QX type, SSEL, ASEL and PSEL: 0 ch “OPEN 0”

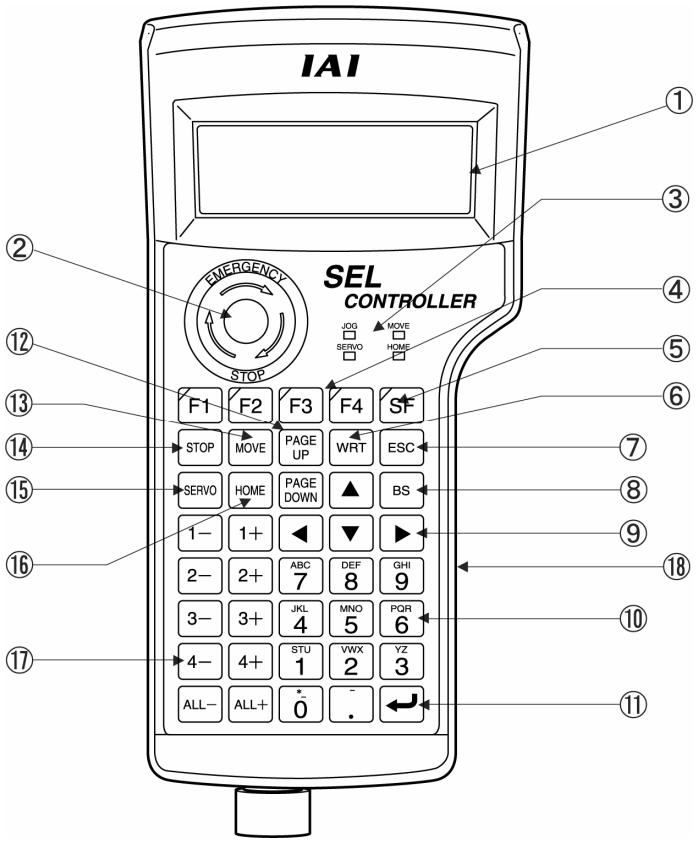
The above “Extra Caution” notes pertain to all other than “MANU mode with I/O parameter No. 90 = 2 (IAI Protocol).

6. Teaching Pendant Function and Specifications

6.1 General Specifications

Item	Specification
Compliance with UL and CE Standards	Compliant
Working Ambient Temperature and Humidity	Temperature: 0 ～ 40°C, Humidity: 10 ～ 90% (No condensation)
Protection Code	IP54 (Excluding cable connectors)
Working Ambient Atmosphere	No corrosive gas
Weight	Approx. 0.4 kg (Excluding cables)
Cable Length	5m

6.2 Main Operation Keys and Functions



1. LCD

Displays the edit or teaching description of each set value up to 4 lines of 20 characters.

2. EMERGENCY STOP Push-button Switch

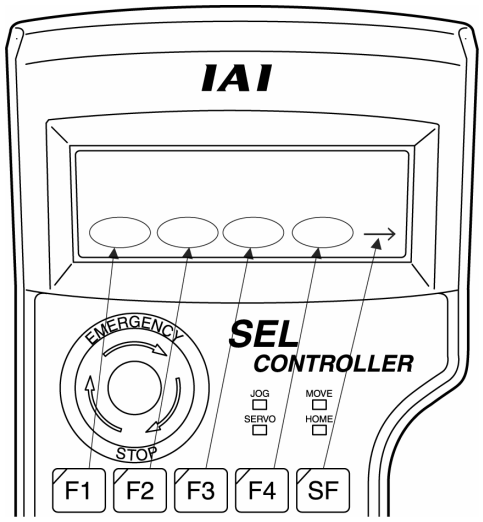
Executes emergency stop.

3. LED

- JOG
  When this LED is lit, jog operation is possible with 1-, 2-, 3-, 4-, ALL-, 1+, 2+, 3+, 4+ or ALL+.
- MOVE
  When this LED is lit, position movement or continuous movement operation is possible with 1-, 2-, 3-, 4-, ALL-, 1+, 2+, 3+, 4+ or ALL+.
- SERVO
  When this LED is lit, servo ON/OFF operation is possible with 1-, 2-, 3-, 4-, ALL-, 1+, 2+, 3+, 4+ or ALL+.
- HOME
  When this LED is lit, homing operation is possible with 1-, 2-, 3-, 4-, ALL-, 1+, 2+, 3+, 4+ or ALL+.

4. F1 F2 F3 F4 (Function keys)

Correspond to each item in the LCD display (function key section).
The LED is lit when the relevant key is operable.



5. SF key (Shift key)

If there are more than 5 selectable functions ("→" will be displayed at right side of the function key area), it will change the display items in the function key area.) When the key is operable, its LED is lit.

6. WRT key (Write key)

Transmits edit data to the controller. (Data will be saved in the memory of the controller.)
Only the data shows on the LCD display will be transmitted. (Plural position No., program step No, etc., can't be transmitted all together at the same time.)

7. ESC key (Escape key)

Returns to the previous status from the current status.
If you press this key during data input, the data will be cancelled.

8. BS key (Backspace key)

If you press this key during data input, clear one letter before.
At other time, clear the data where the cursor is placed.

9. ◀ ▲ ▼ ▶ (Cursor key)

Moves the cursor.

10. 10 keys

You can input number, alphabet, and sign.
When the cursor is at any item requiring the input of characters other than "0" to "9" (such as hexadecimal and character strings), the input mode selection is displayed in the function key area. (Alph: alphabet symbol input, Num: numerical value input)

11. [↵] **key (Return key)**

Confirms the input data and moves the cursor position forward .

12. [**PAGE UP**] · [**PAGE DOWN**] **key**

Increment or decrement edit and display item No. (Position No., Program No., Step No., etc.)

13. [**MOVE**] **key**

Enables actuator movement or continuous operation. The LED of MOVE is lit. (It is valid in the Teac (teach) mode area.)

When you press a jog key such as [1+] and [1-] after enabling movement or continuous operation, movement action starts. However, it is required to switch servo ON when the servo is OFF.

Jog operation is made possible after the action has been completed or stopped. The LED of JOG is lit up.

14. [**STOP**] **key**

Stops actuator movement or continuous movement. (It is valid in the Teac (teach) mode area with the servo ON.)

15. [**SERVO**] **key**

Enables axis servo ON/OFF switching operation. The LED of SERVO is lit up. (It is valid in the Teac (teach) mode area.)

When you press a + jog key such as [1+] after enabling servo ON/OFF switching operation, the servo is turned ON. When you press a - jog key such as [1-], the servo is turned OFF.

Jog operation is made possible after the servo has been turned ON/OFF. The LED of JOG is lit. However, when the servo is OFF, the actuator cannot be moved by jog or inching operation unless the servo is turned ON.

16. [**HOME**] **key**

Enables homing operation. The LED of HOME is lit. (It is valid in the Teac (teach) mode area.)

When you press a jog key such as [1+] and [1-] after enabling homing operation, homing starts. However, it is required to turn the servo ON when the servo is OFF.

Jog operation is made possible after homing has been completed. The LED of JOG is lit.

17. [**1-**] [**1+**] [**2-**] [**2+**] [**3-**] [**3+**] [**4-**] [**4+**] [**ALL-**] **and** [**ALL+**] **(Jog keys)**

[1-] Minus direction jog movement for the 1st axis and 5th axis
[1+] Plus direction jog movement for the 1st axis and 5th axis
[2-] Minus direction jog movement for the 2nd axis and 6th axis
[2+] Plus direction jog movement for the 2nd axis and 6th axis
[3-] Minus direction jog movement for the 3rd axis
[3+] Plus direction jog movement for the 3rd axis
[4-] Minus direction jog movement for the 4th axis
[4+] Plus direction jog movement for the 4th axis
[ALL-] Minus direction jog movement for all axes
[ALL+] Plus direction jog movement for all axes

(It is valid in the Teac (teach) mode area with the servo ON

Caution

- Such jog actions with the JOG button are also valid for any not-homed axes. However, coordinate values in this case have no meaning. Therefore, be extremely careful about interference with the stroke end.
- If jog operation is performed to the axis in action under the operation-button-acceptable condition, the operation of the applicable axis is aborted when the JOG operation button is turned OFF. (The next operation starts, if any.)

18. Deadman switch (*Option)

The Deadman switch has three-level conditions. The ON/OFF in each level is as shown below.

1st level	Switch OFF	Condition in which the switch is released or a switch pressing force is too weak
2nd level	Switch ON	Condition in which the switch is pressed by an appropriate force
3rd level	Switch OFF	Condition in which the switch is pressed by a strong force

In the switch ON condition, servo ON is possible.

In the switch OFF condition, the driver power is cut off and the servo is turned OFF.

Even in the switch OFF condition, operation is possible in the mode not requiring servo ON (such as the edit mode).

◎Some controllers such as the X-SEL-K controller display the message shown below when the power is turned on.
If you press the ESC key, the mode selection screen will be displayed and operation will become possible in the mode not requiring servo ON even in the switch OFF condition.

```
Msg  [BE1]
TP  Deadman  Sw  OFF

Back  Next
```

◎When the switch is OFF, the panel window 7-segment LED of the X-SEL-K or KX controller displays “dsf.”
The panel window 7-segment LED of the X-SEL-P/Q or PX/QX controller displays “enb.”

Caution

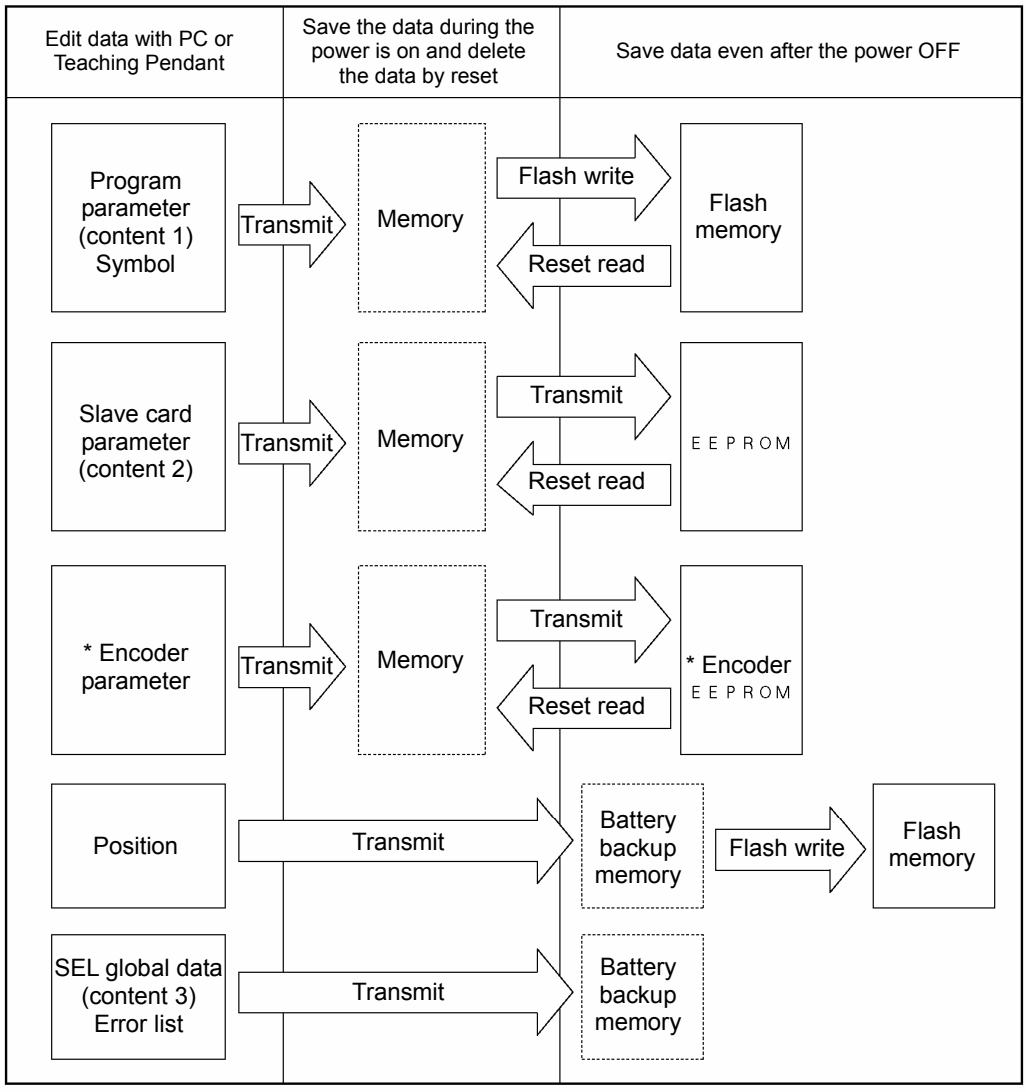
- The Deadman switch is valid when the controller’s mode switch is on the MANU side.
- The driver power cannot be cut off regardless of the switch condition when the controller’s mode switch is on the AUTO side.

7. How to Save Data

Since the Controller adopts flash memory, there is a storage area by battery backup and a storage area by flash memory according to the data to be stored.
In addition, even if data is transferred from the PC software or Teaching Pendant, the data is only to be written in memory as shown in the chart below and the data is erased by power-off or controller reset.
To ensure data storage, write the data you want to store in flash memory.

7-1. Set-up at Shipment with System Memory Backup Battery

(Other parameter No. 20=2 (System memory backup battery equipped))



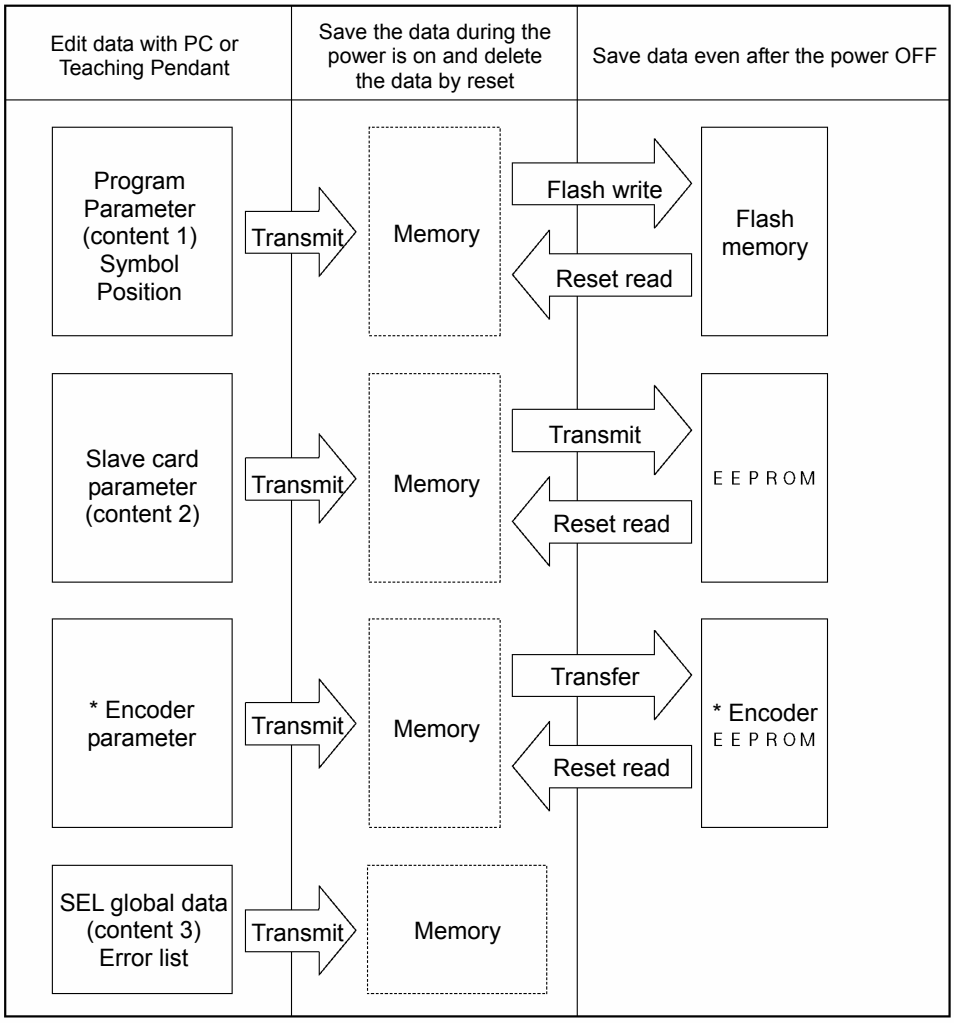
* Encoder parameters are not stored within the controller but in the EEPROM of the actuator's encoder itself. They are read into the controller at power-on or software-reset time.

Since the program, parameter, and symbol will be read from flash memory at restart time, the data in memory becomes the original data before editing unless the data is written in flash memory.
The controller always operates according to the data in memory (within the dotted box) excluding parameters.

Content 1: Parameters excluding content 2 below and encoder parameter
Content 2: Driver card, IO slot card (electric power type card) parameter (X-SEL-K, KX, TT)
: IO slot card (electric power type card) parameter (X-SEL-P/Q, PX/QX, SSEL, ASEL, PSEL)
Content 3: Flag, Variable, and String

7-2. Set-up at Shipment without System Memory Backup Battery (Table Top Actuator (TT), SSEL, ASEL, PSEL)

Other parameter No.20=0 (System memory backup battery unequipped)



Since the program, parameter, symbol, and position will be read from flash memory at restart time, the data in memory becomes the original data before editing unless the data is written in flash memory.

The controller always operates according to the data in memory (within the dotted box) excluding parameters.
Note: SEL global data can't be saved without the backup battery.

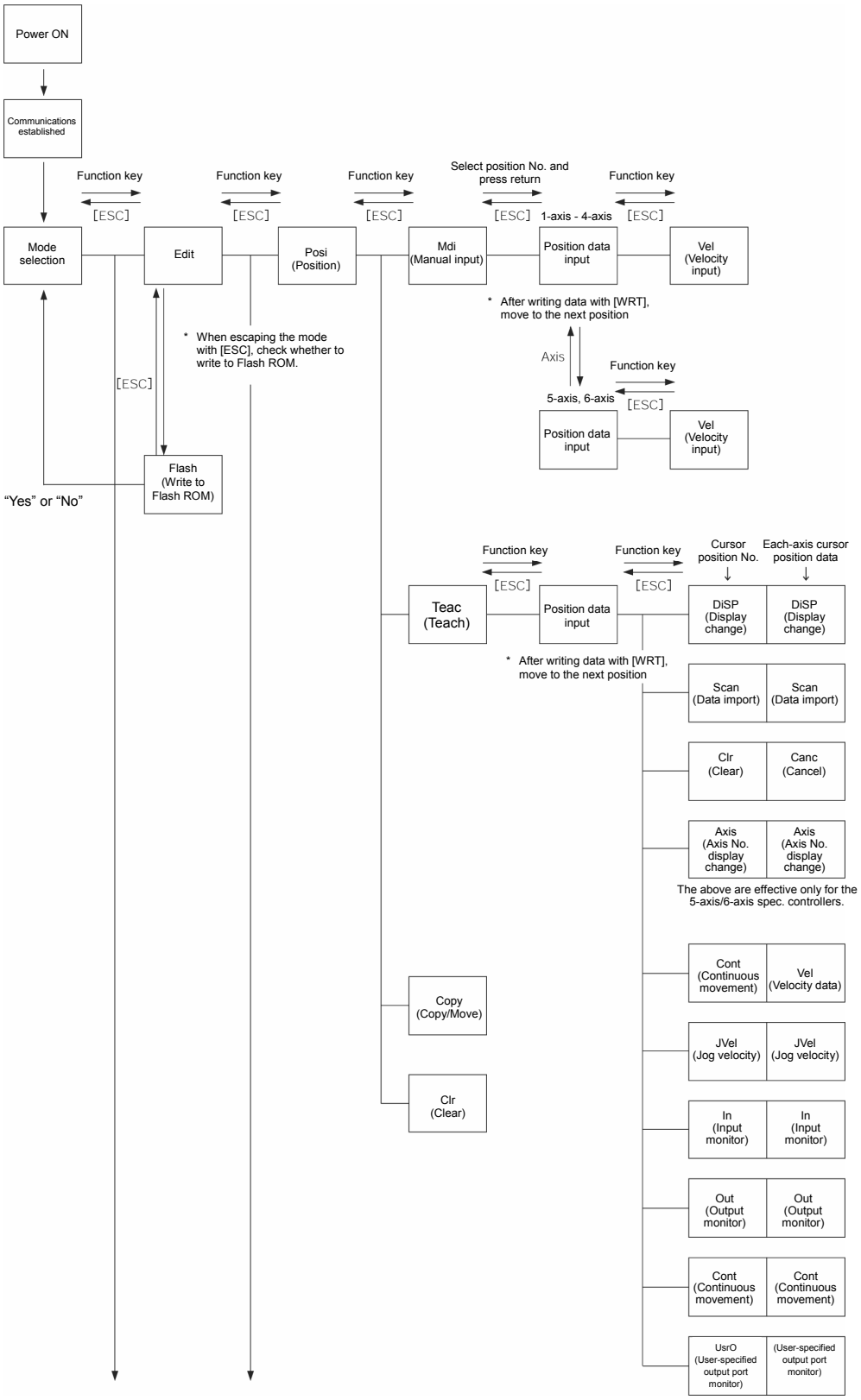
7-3. Caution

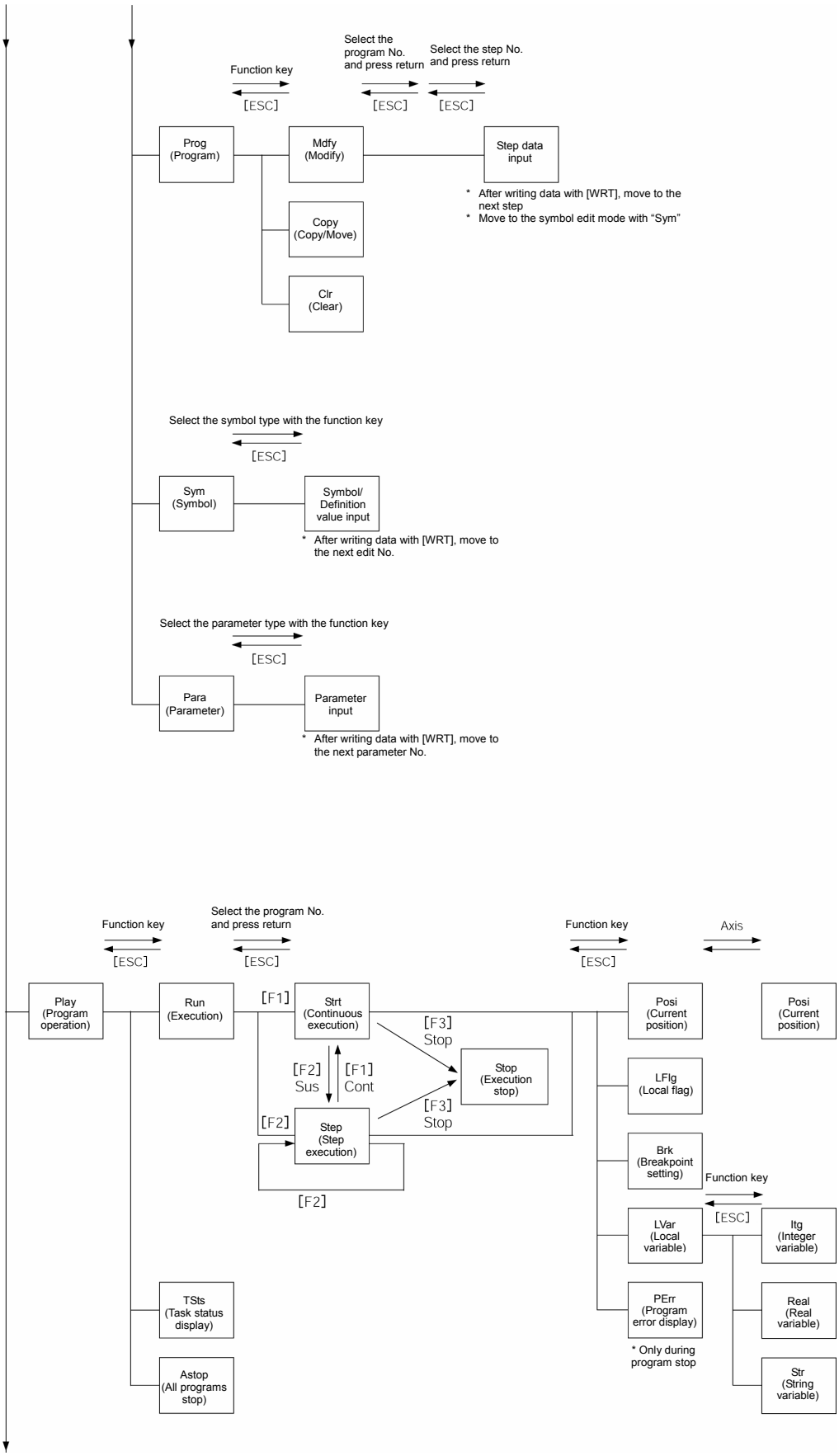
Cautions in data transfer and flash writing

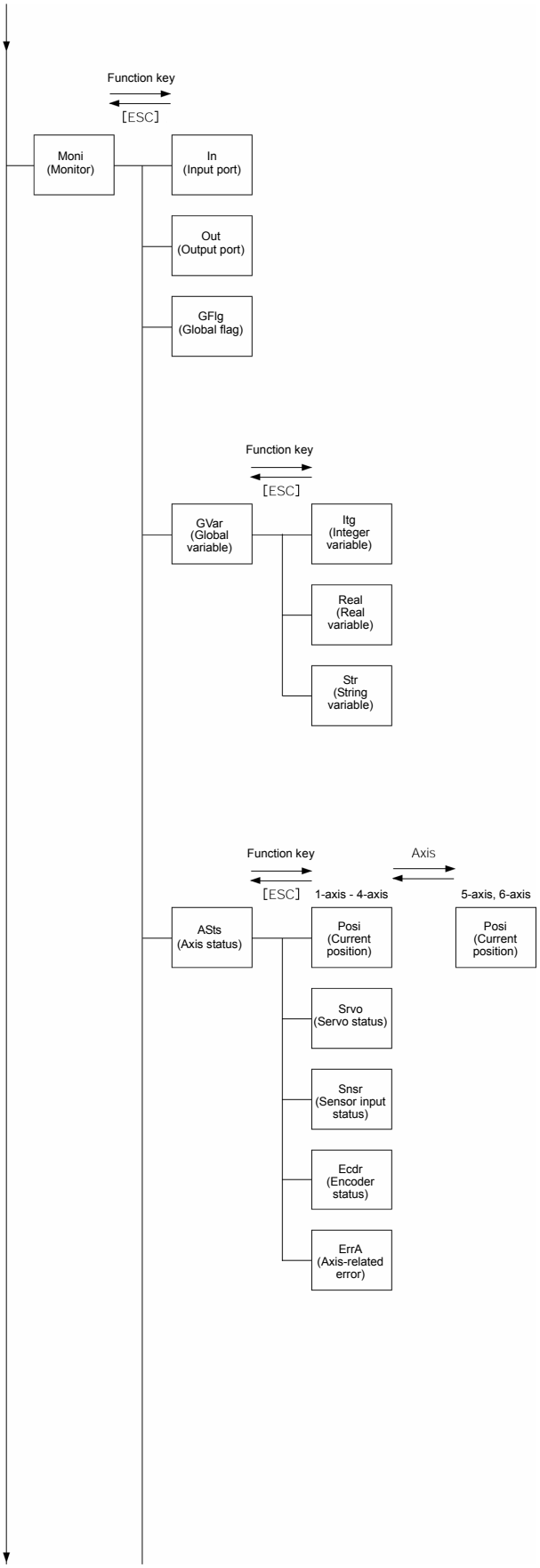
Never shut OFF the main power while the data is transmitting and writing into flash.
Data may be lost and controller may be rendered inoperable.

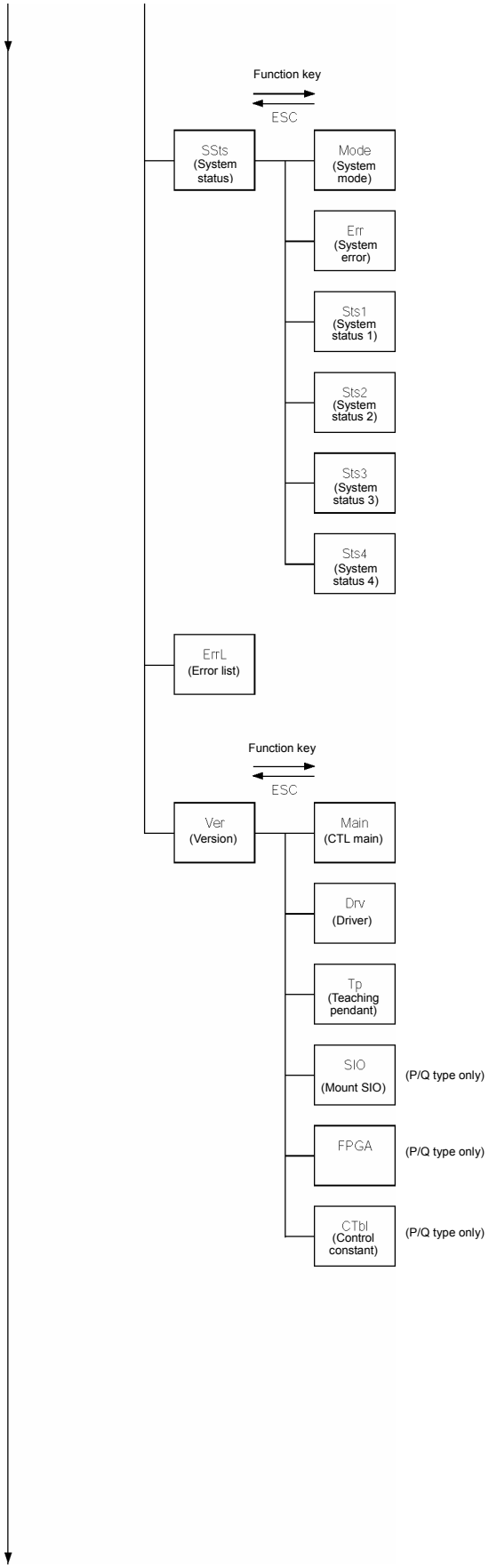
8. Mode Transition Diagram

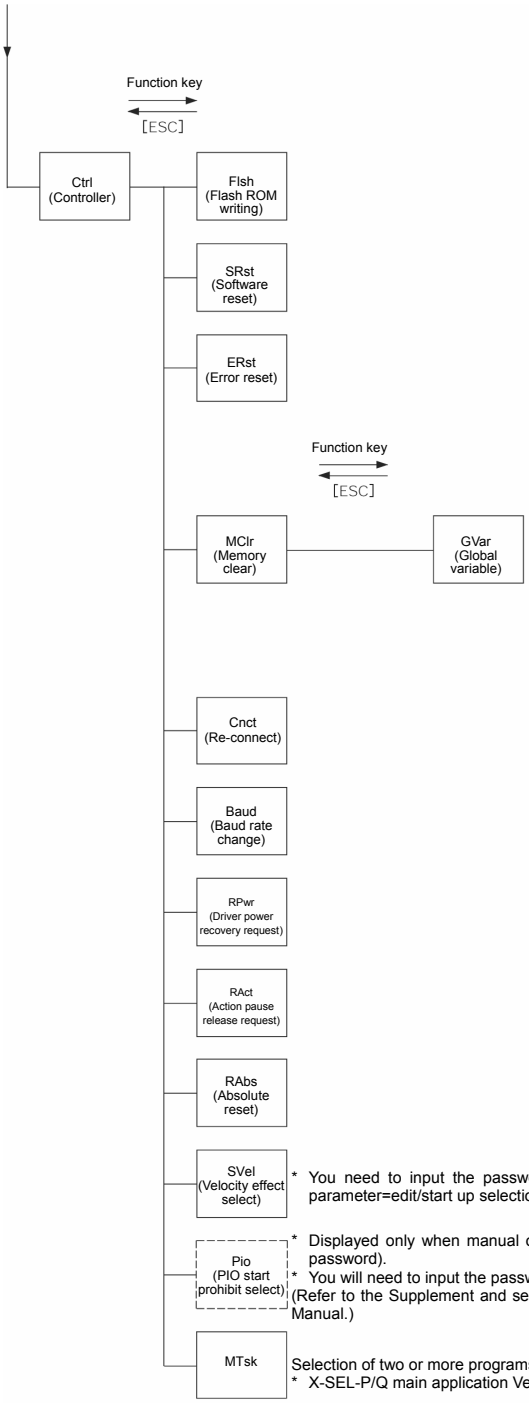
8-1. X-SEL K, P/Q, TT Controller




Function key
[ESC]
Select the program No. and press return
[ESC]
Select the step No. and press return
[ESC]
Prog (Program)
Mdfy (Modify)
Step data input
* After writing data with [WRT], move to the next step
* Move to the symbol edit mode with "Sym"
Copy (Copy/Move)
Clr (Clear)
Select the symbol type with the function key
[ESC]
Sym (Symbol)
Symbol/ Definition value input
* After writing data with [WRT], move to the next edit No.
Select the parameter type with the function key
[ESC]
Para (Parameter)
Parameter input
* After writing data with [WRT], move to the next parameter No.
Function key
[ESC]
Select the program No. and press return
[ESC]
Function key
[ESC]
Axis
Play (Program operation)
Run (Execution)
[F1]
Strt (Continuous execution)
[F3] Stop
[F2] Sus
[F1] Cont
Stop (Execution stop)
[F3] Stop
[F2]
Step (Step execution)
[F2]
Posi (Current position)
Posi (Current position)
LFlg (Local flag)
Brk (Breakpoint setting)
Function key
[ESC]
LVar (Local variable)
Itg (Integer variable)
Real (Real variable)
Str (String variable)
PErr (Program error display)
* Only during program stop
TSts (Task status display)
Astop (All programs stop)


Function key
[ESC]
Moni
(Monitor)
In
(Input port)
Out
(Output port)
GFlg
(Global flag)
Function key
[ESC]
GVar
(Global
variable)
Itg
(Integer
variable)
Real
(Real
variable)
Str
(String
variable)
Function key
[ESC]
Axis
1-axis - 4-axis
5-axis, 6-axis
ASts
(Axis status)
Posi
(Current
position)
Posi
(Current
position)
Srvo
(Servo status)
Snsr
(Sensor input
status)
Ecdr
(Encoder
status)
ErrA
(Axis-related
error)

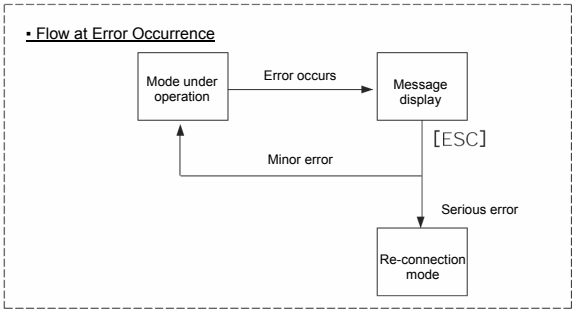

Function key
ESC
SSts (System status)
Mode (System mode)
Err (System error)
Sts1 (System status 1)
Sts2 (System status 2)
Sts3 (System status 3)
Sts4 (System status 4)
ErrL (Error list)
Function key
ESC
Ver (Version)
Main (CTL main)
Drv (Driver)
Tp (Teaching pendant)
SIO (Mount SIO)
(P/Q type only)
FPGA
(P/Q type only)
CTbl (Control constant)
(P/Q type only)



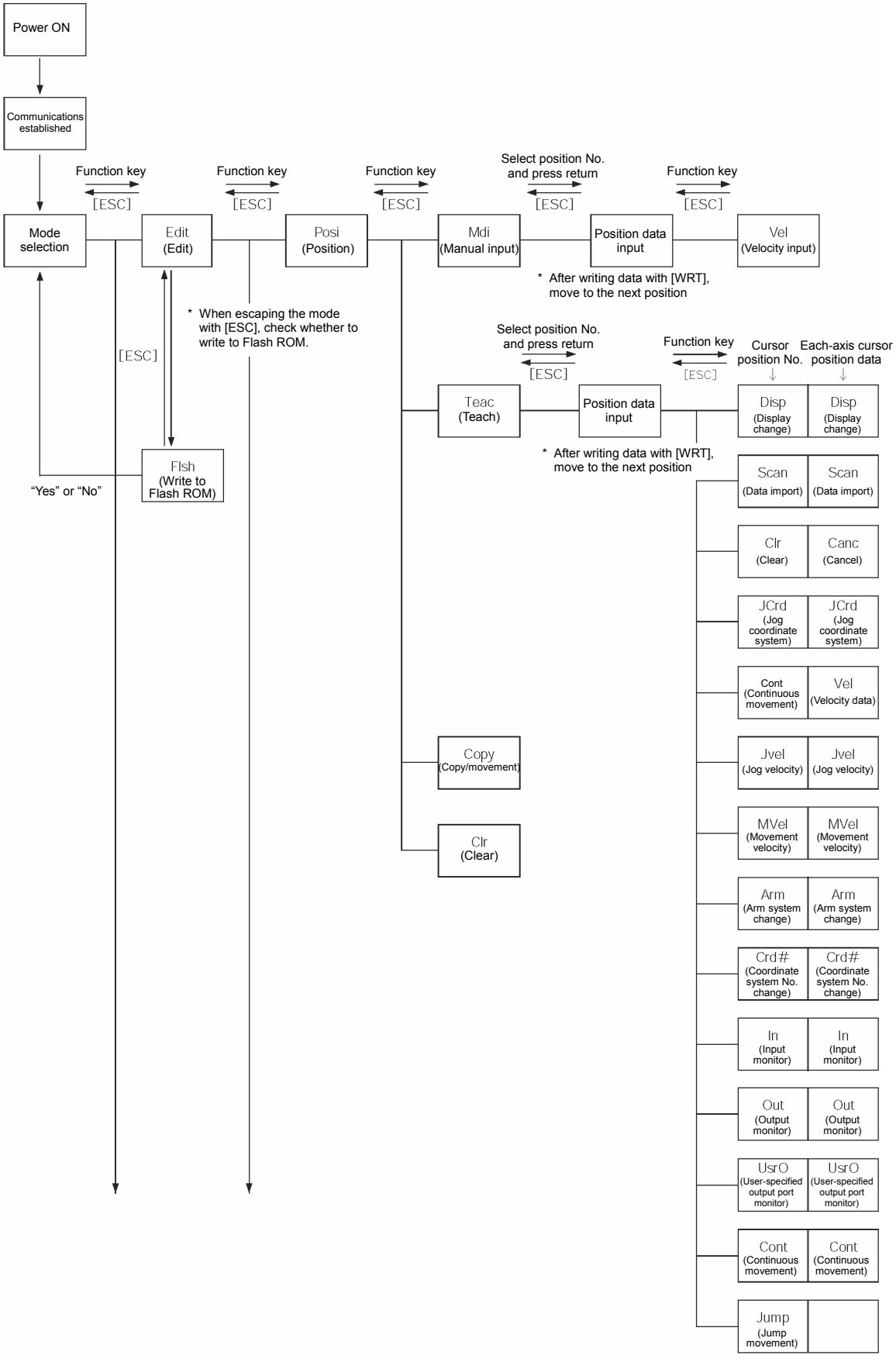
* You need to input the password to change setting, when manual operation classification parameter=edit/start up selection (with password).

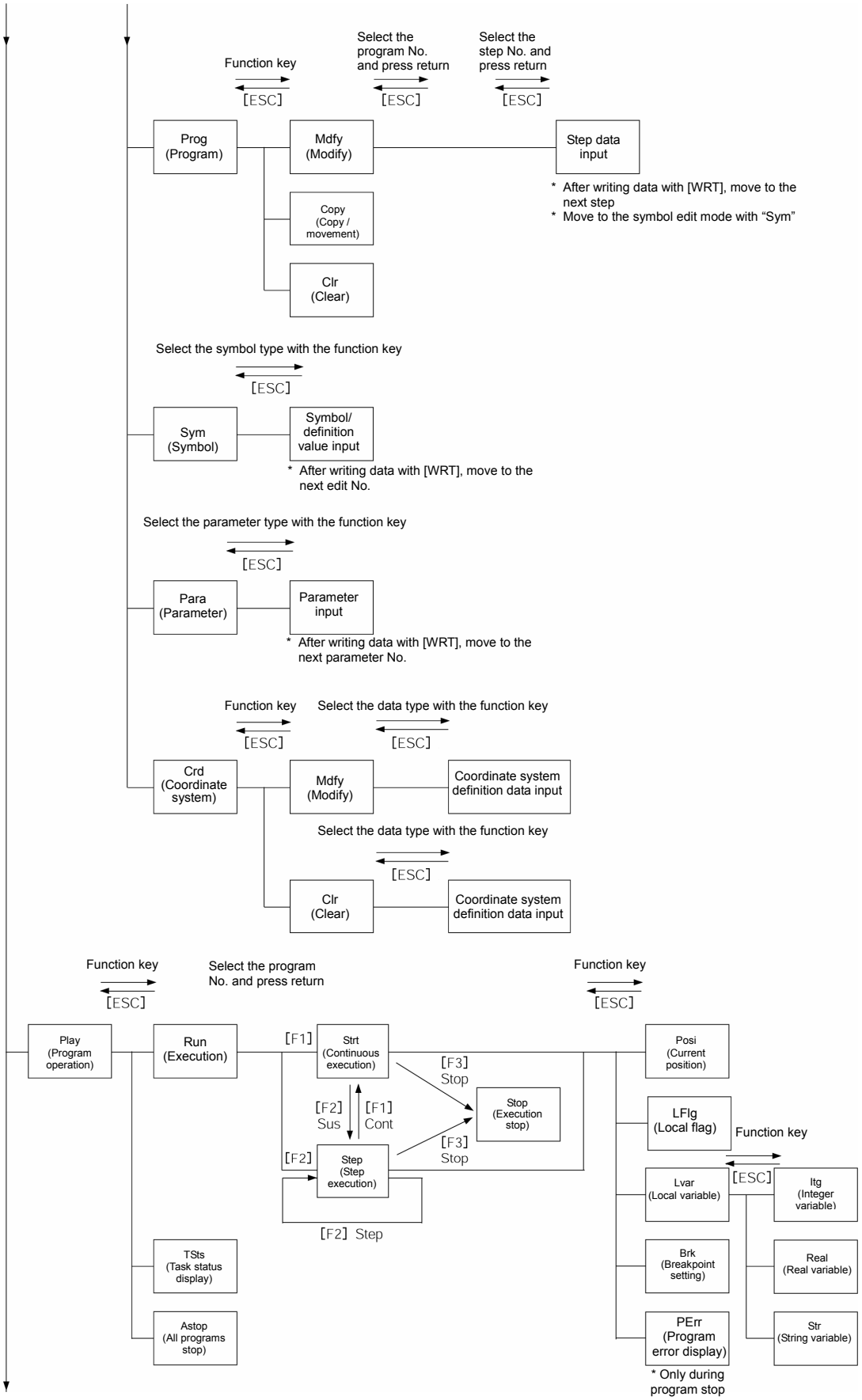
* Displayed only when manual operation classification parameter=edit/start up selection (with password).
* You will need to input the password to change setting.
(Refer to the Supplement and section 8 “Manual Operation” in the X-SEL Controller Instruction Manual.)

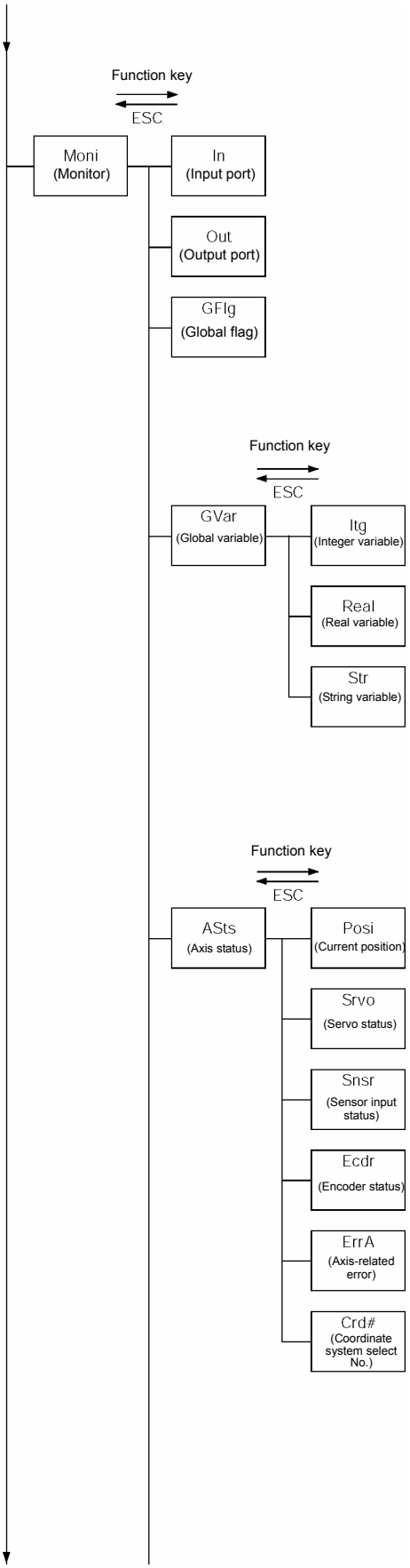
Selection of two or more programs start prohibition/permission
* X-SEL-P/Q main application Ver. 0.36 or later

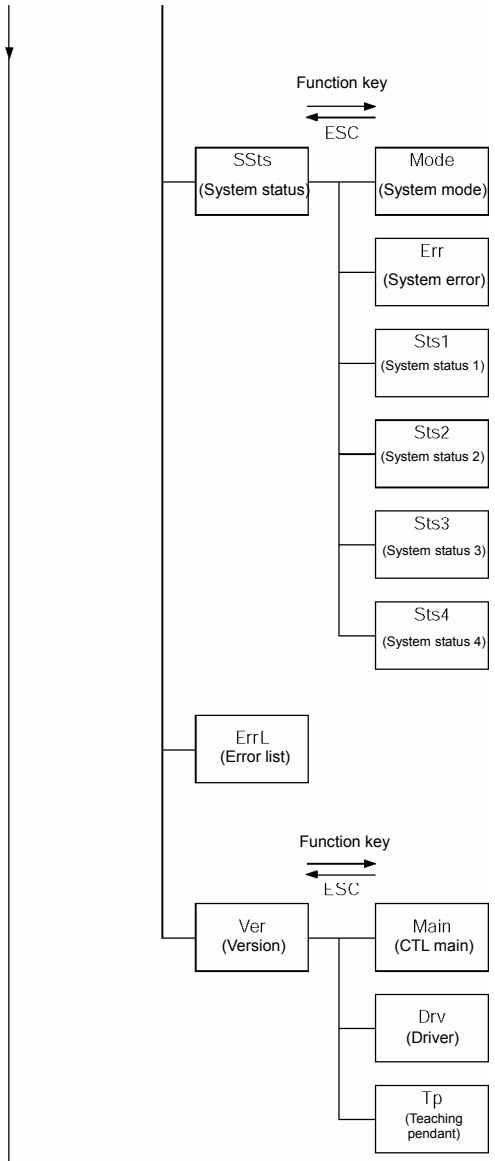


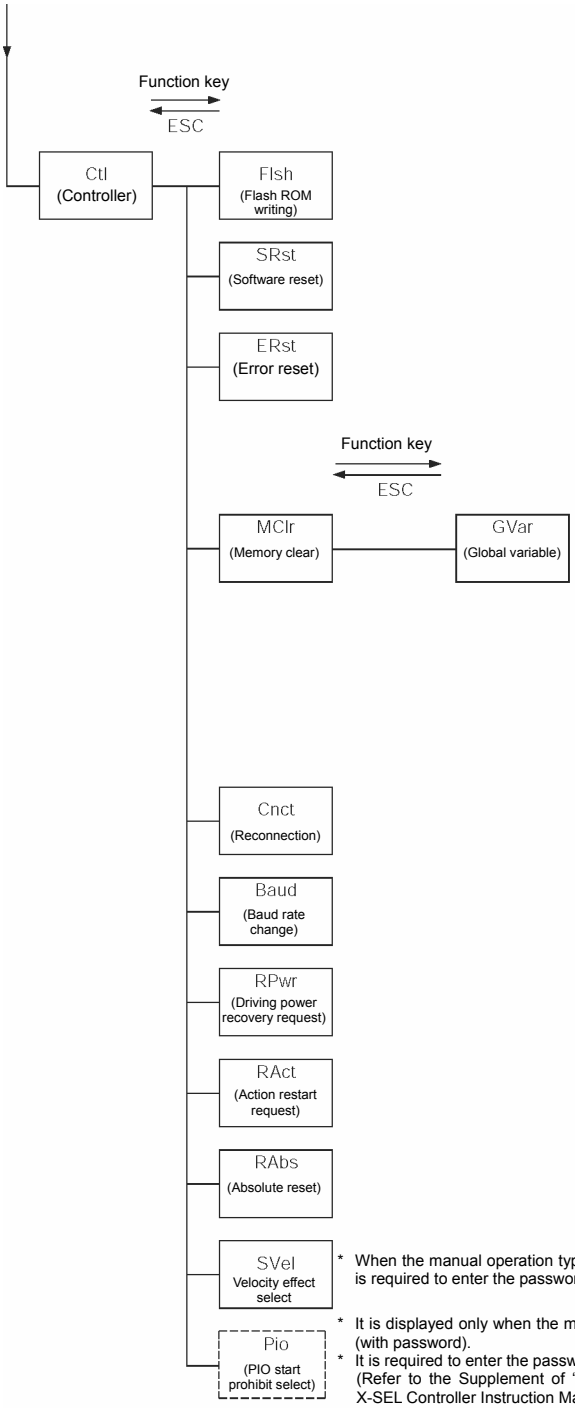
8-2. X-SEL KX Controller




Function key
[ESC]
Select the program No. and press return
[ESC]
Select the step No. and press return
[ESC]
Prog (Program)
Mdfy (Modify)
Step data input
* After writing data with [WRT], move to the next step
* Move to the symbol edit mode with “Sym”
Copy (Copy / movement)
Clr (Clear)
Select the symbol type with the function key
[ESC]
Sym (Symbol)
Symbol/ definition value input
* After writing data with [WRT], move to the next edit No.
Select the parameter type with the function key
[ESC]
Para (Parameter)
Parameter input
* After writing data with [WRT], move to the next parameter No.
Function key
[ESC]
Select the data type with the function key
[ESC]
Crd (Coordinate system)
Mdfy (Modify)
Coordinate system definition data input
Select the data type with the function key
[ESC]
Clr (Clear)
Coordinate system definition data input
Function key
[ESC]
Select the program No. and press return
Function key
[ESC]
Play (Program operation)
Run (Execution)
[F1]
Strt (Continuous execution)
[F3] Stop
Stop (Execution stop)
[F2] Sus
[F1] Cont
[F2]
Step (Step execution)
[F3] Stop
[F2] Step
TSts (Task status display)
Astop (All programs stop)
Posi (Current position)
LFlg (Local flag)
Function key
[ESC]
Lvar (Local variable)
Itg (Integer variable)
Brk (Breakpoint setting)
Real (Real variable)
PErr (Program error display)
Str (String variable)
* Only during program stop

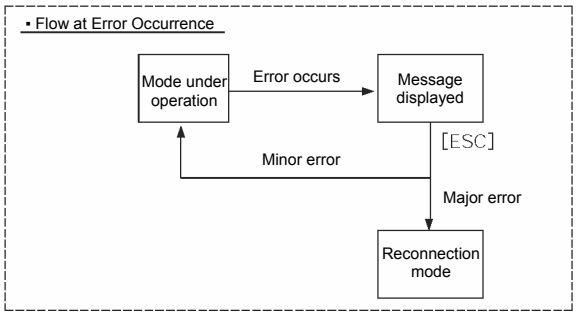

Function key
ESC
Moni
(Monitor)
In
(Input port)
Out
(Output port)
GFlg
(Global flag)
Function key
ESC
GVar
(Global variable)
Itg
(Integer variable)
Real
(Real variable)
Str
(String variable)
Function key
ESC
ASts
(Axis status)
Posi
(Current position)
Srvo
(Servo status)
Snsr
(Sensor input status)
Ecdr
(Encoder status)
ErrA
(Axis-related error)
Crd#
(Coordinate system select No.)


Function key
ESC
SSts
(System status)
Mode
(System mode)
Err
(System error)
Sts1
(System status 1)
Sts2
(System status 2)
Sts3
(System status 3)
Sts4
(System status 4)
ErrL
(Error list)
Function key
ESC
Ver
(Version)
Main
(CTL main)
Drv
(Driver)
Tp
(Teaching pendant)

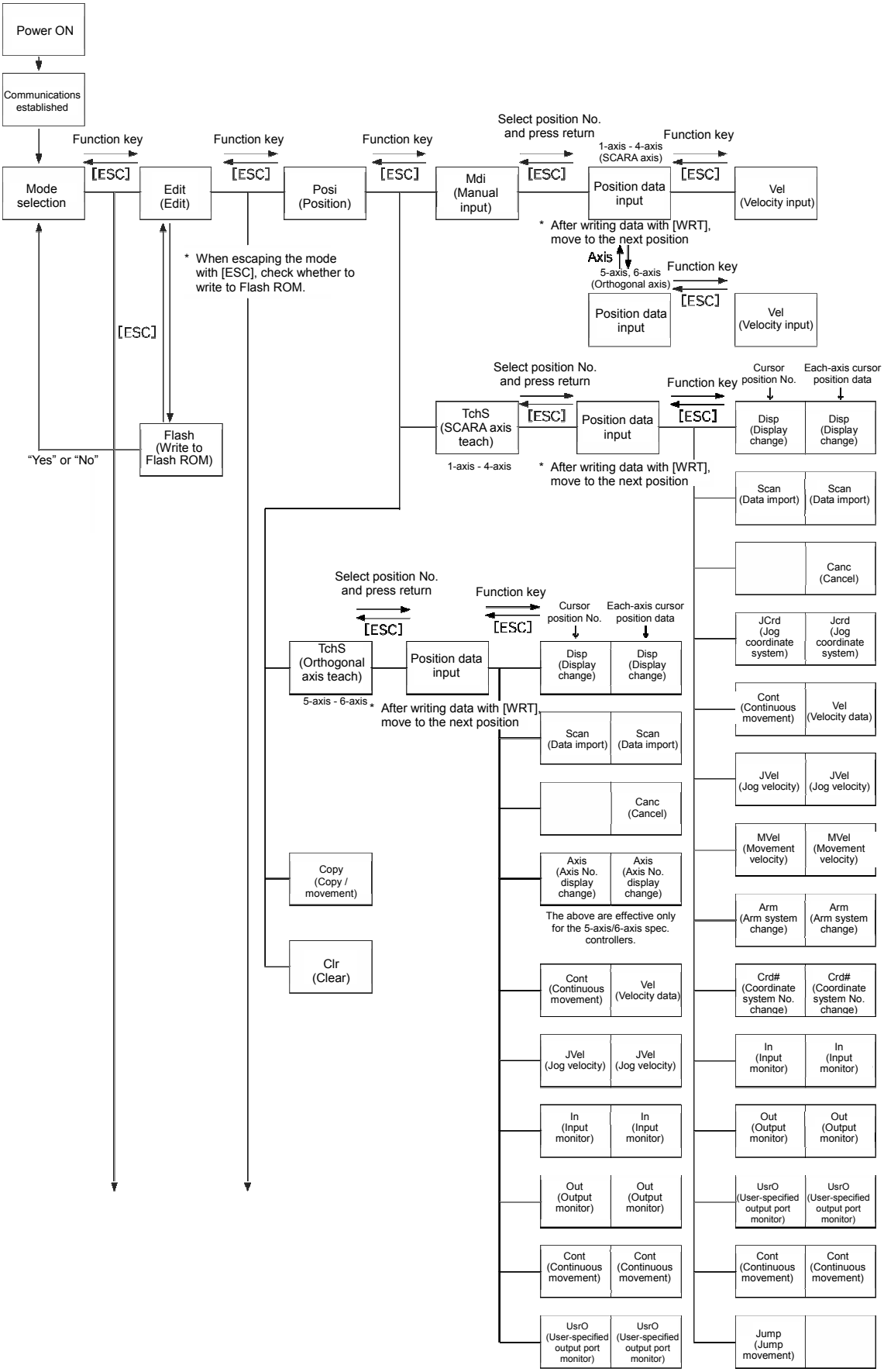


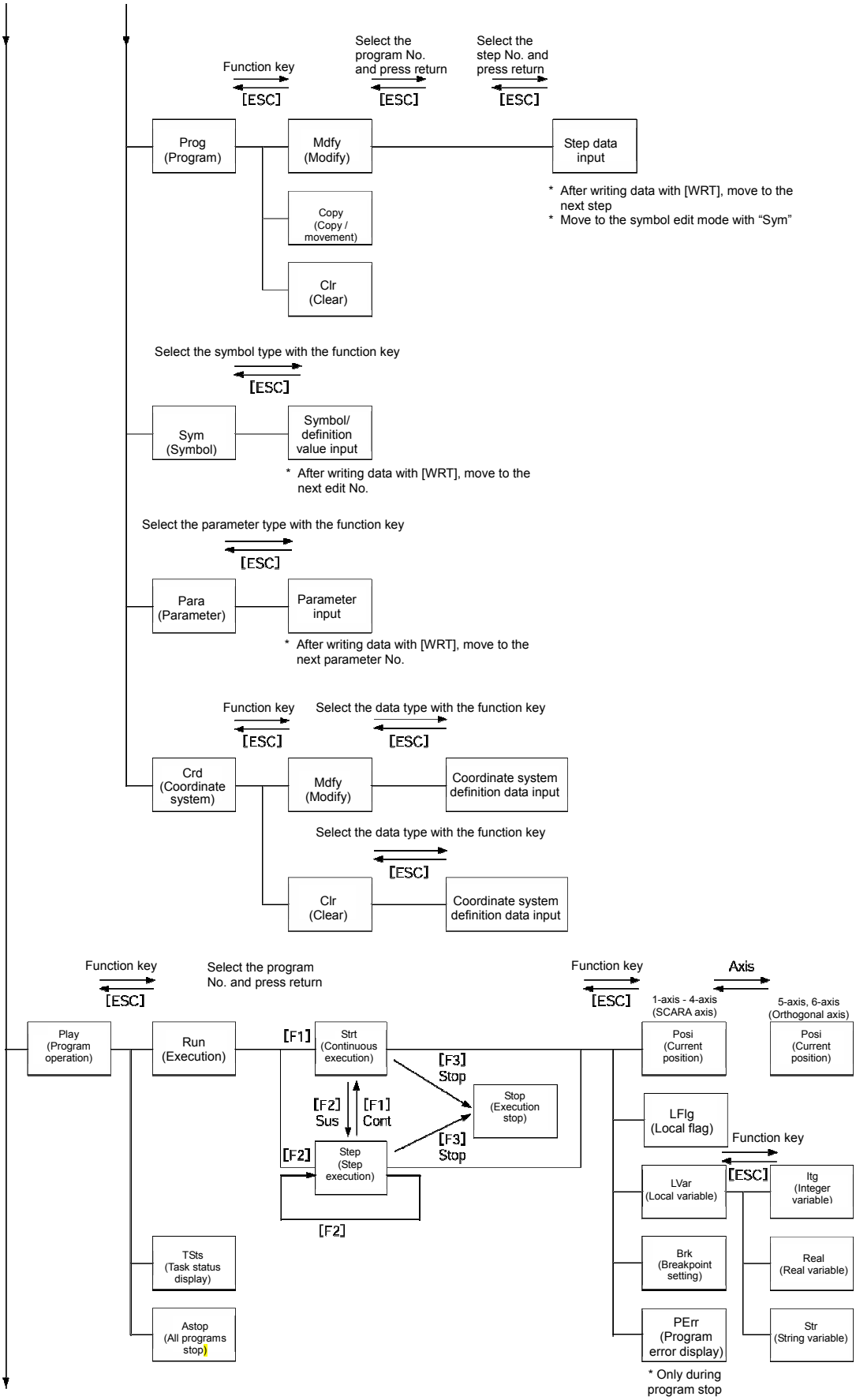
* When the manual operation type parameter equals edit and start selection (with password), it is required to enter the password at setting change time.

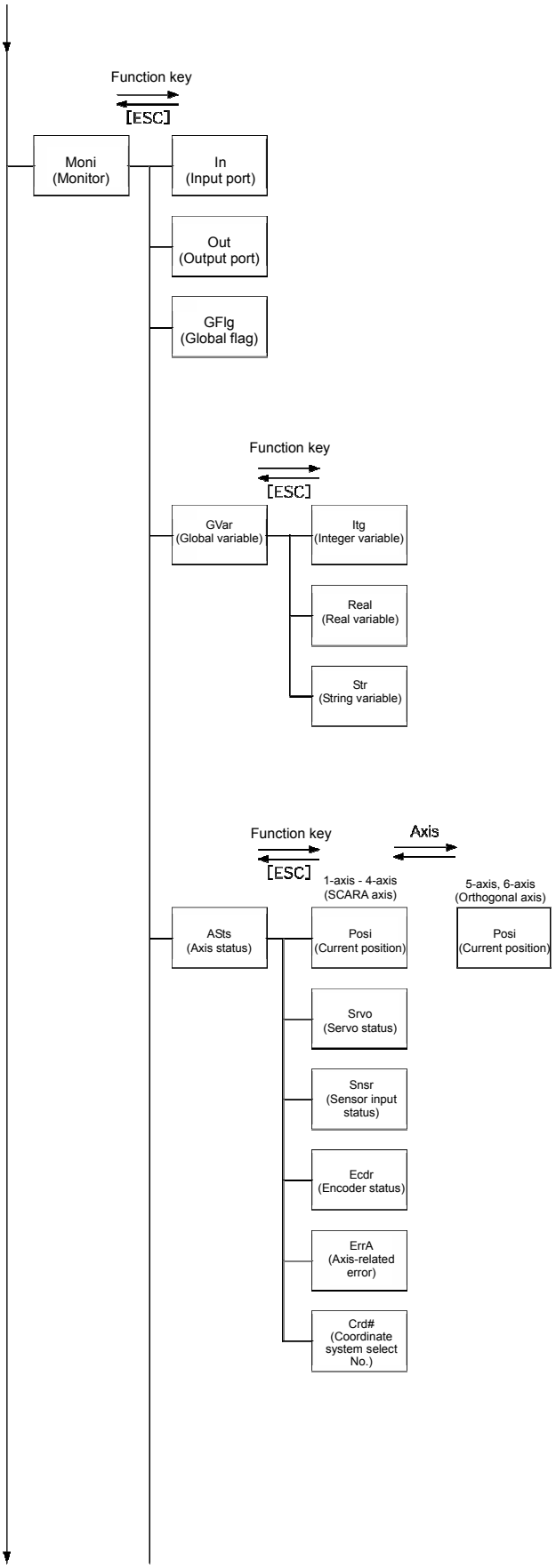
* It is displayed only when the manual operation type parameter equals edit and start selection (with password).
* It is required to enter the password at setting change time.
(Refer to the Supplement of “List of Parameters” and “8. Manual Operation Types” in the X-SEL Controller Instruction Manual.)

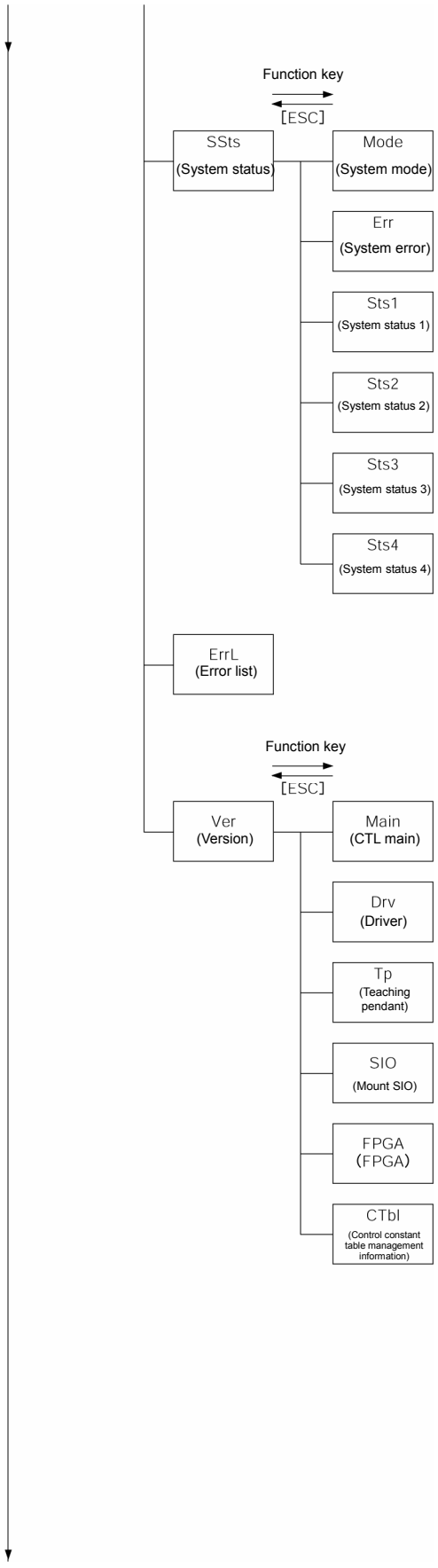


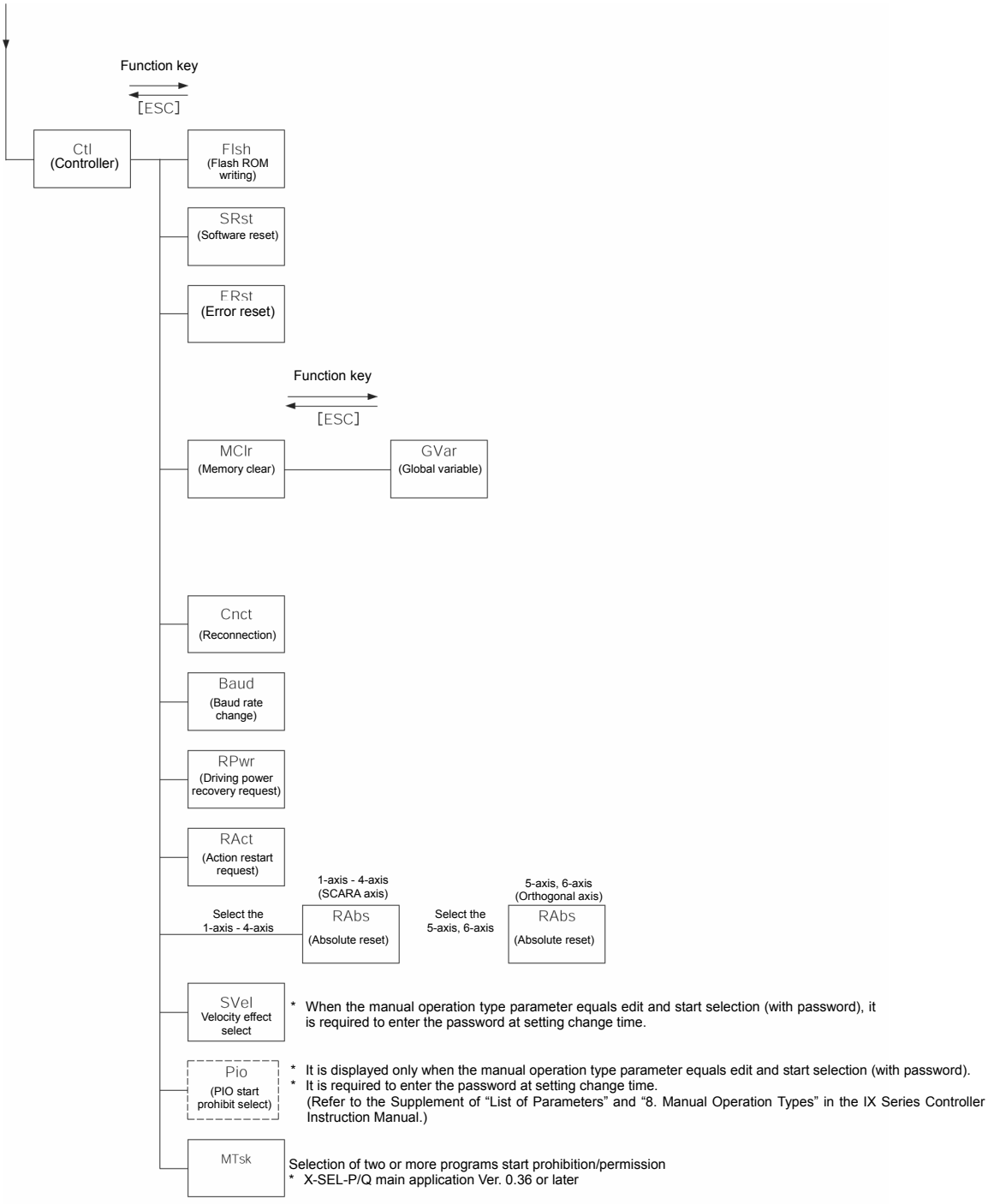
8-3. X-SEL PX/QX Controller




Function key
[ESC]
Select the program No. and press return
[ESC]
Select the step No. and press return
[ESC]
Prog (Program)
Mdfy (Modify)
Step data input
* After writing data with [WRT], move to the next step
* Move to the symbol edit mode with "Sym"
Copy (Copy / movement)
Clr (Clear)
Select the symbol type with the function key
[ESC]
Sym (Symbol)
Symbol/ definition value input
* After writing data with [WRT], move to the next edit No.
Select the parameter type with the function key
[ESC]
Para (Parameter)
Parameter input
* After writing data with [WRT], move to the next parameter No.
Function key
[ESC]
Select the data type with the function key
[ESC]
Crd (Coordinate system)
Mdfy (Modify)
Coordinate system definition data input
Select the data type with the function key
[ESC]
Clr (Clear)
Coordinate system definition data input
Function key
[ESC]
Select the program No. and press return
Play (Program operation)
Run (Execution)
[F1]
Strt (Continuous execution)
[F3] Stop
[F2] Sus
[F1] Cont
Stop (Execution stop)
[F3] Stop
[F2]
Step (Step execution)
[F2]
TSts (Task status display)
Astop (All programs stop)
Function key
[ESC]
Axis
1-axis - 4-axis (SCARA axis)
5-axis, 6-axis (Orthogonal axis)
Posi (Current position)
Posi (Current position)
LFlg (Local flag)
Function key
[ESC]
LVar (Local variable)
Itg (Integer variable)
Real (Real variable)
Brk (Breakpoint setting)
PErr (Program error display)
Str (String variable)
* Only during program stop


Function key
[ESC]
Moni
(Monitor)
In
(Input port)
Out
(Output port)
GFlg
(Global flag)
Function key
[ESC]
GVar
(Global variable)
Itg
(Integer variable)
Real
(Real variable)
Str
(String variable)
Function key
[ESC]
Axis
1-axis - 4-axis
(SCARA axis)
5-axis, 6-axis
(Orthogonal axis)
ASts
(Axis status)
Posi
(Current position)
Posi
(Current position)
Srvo
(Servo status)
Snsr
(Sensor input status)
Ecdr
(Encoder status)
ErrA
(Axis-related error)
Crd#
(Coordinate system select No.)

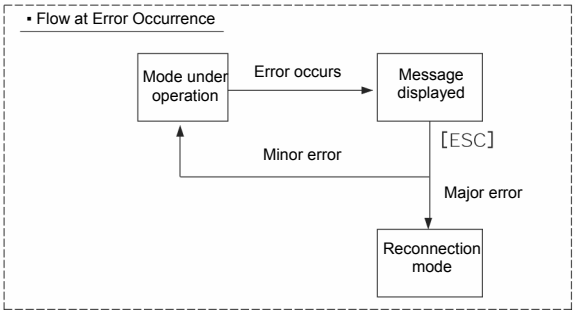

Function key
[ESC]
SSts
(System status)
Mode
(System mode)
Err
(System error)
Sts1
(System status 1)
Sts2
(System status 2)
Sts3
(System status 3)
Sts4
(System status 4)
ErrL
(Error list)
Function key
[ESC]
Ver
(Version)
Main
(CTL main)
Drv
(Driver)
Tp
(Teaching pendant)
SIO
(Mount SIO)
FPGA
(FPGA)
CTbl
(Control constant table management information)



* When the manual operation type parameter equals edit and start selection (with password), it is required to enter the password at setting change time.

* It is displayed only when the manual operation type parameter equals edit and start selection (with password).
* It is required to enter the password at setting change time.
(Refer to the Supplement of “List of Parameters” and “8. Manual Operation Types” in the IX Series Controller Instruction Manual.)

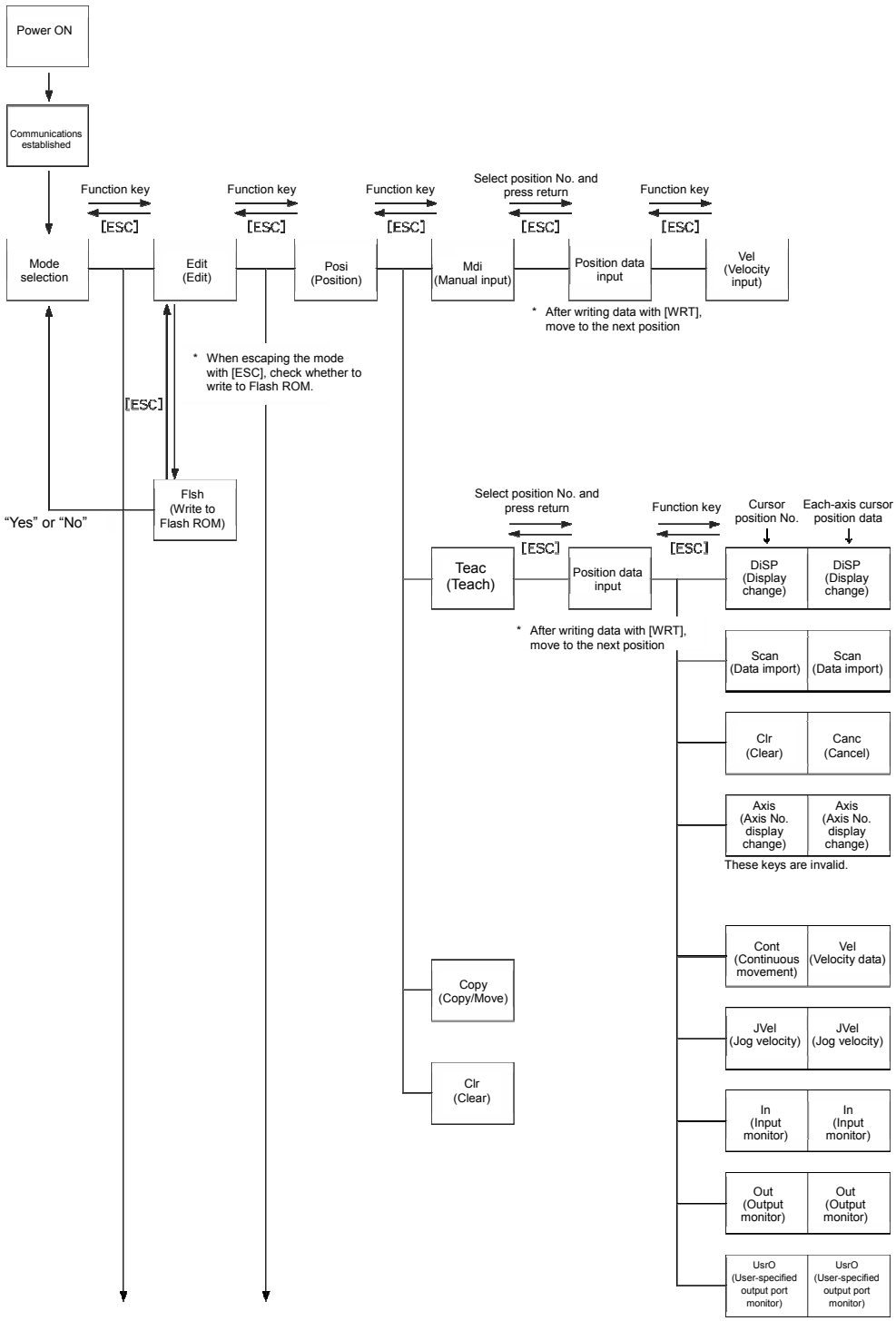
Selection of two or more programs start prohibition/permission
* X-SEL-P/Q main application Ver. 0.36 or later

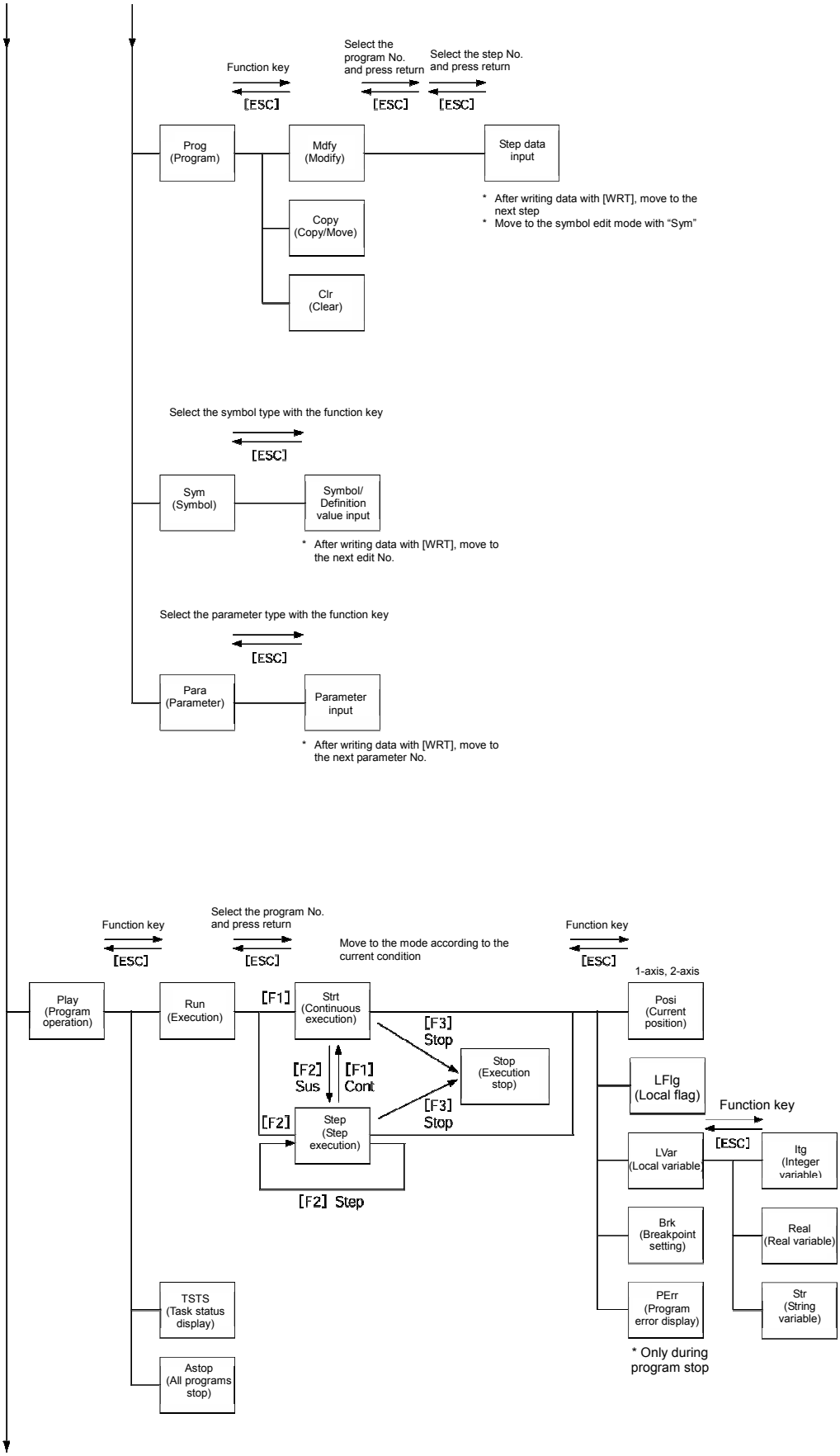


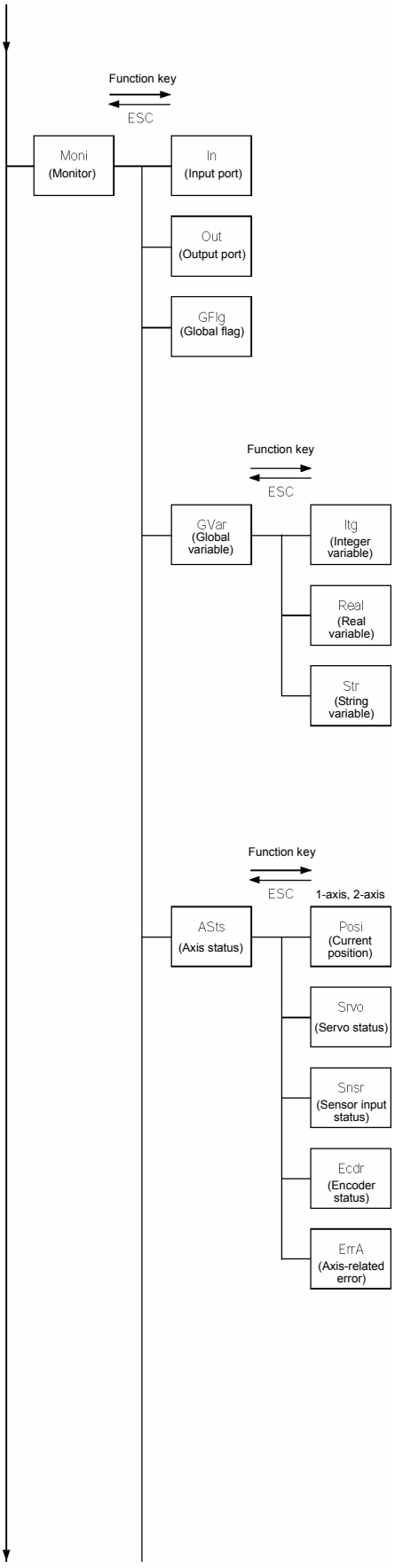
8-4. SSEL, ASEL or PSEL Controller

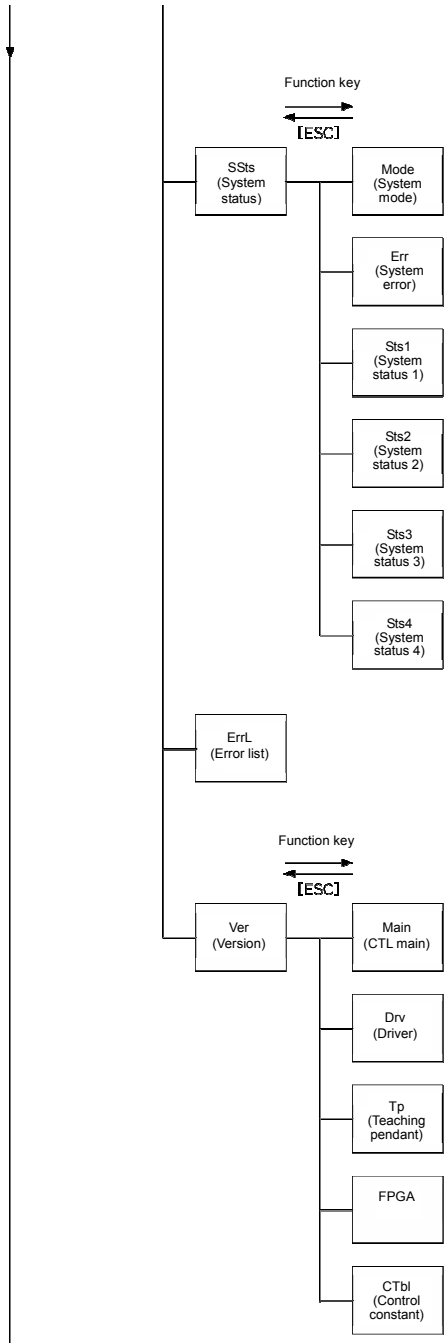
In the case of the SSEL, ASEL or PSEL controller, 2-type selection is possible between the program mode and positioner mode. Set the selection to the other parameter No. 25 “Operation mode type.”
For details, refer to the operating manual of the SSEL, ASEL or PSEL controller.

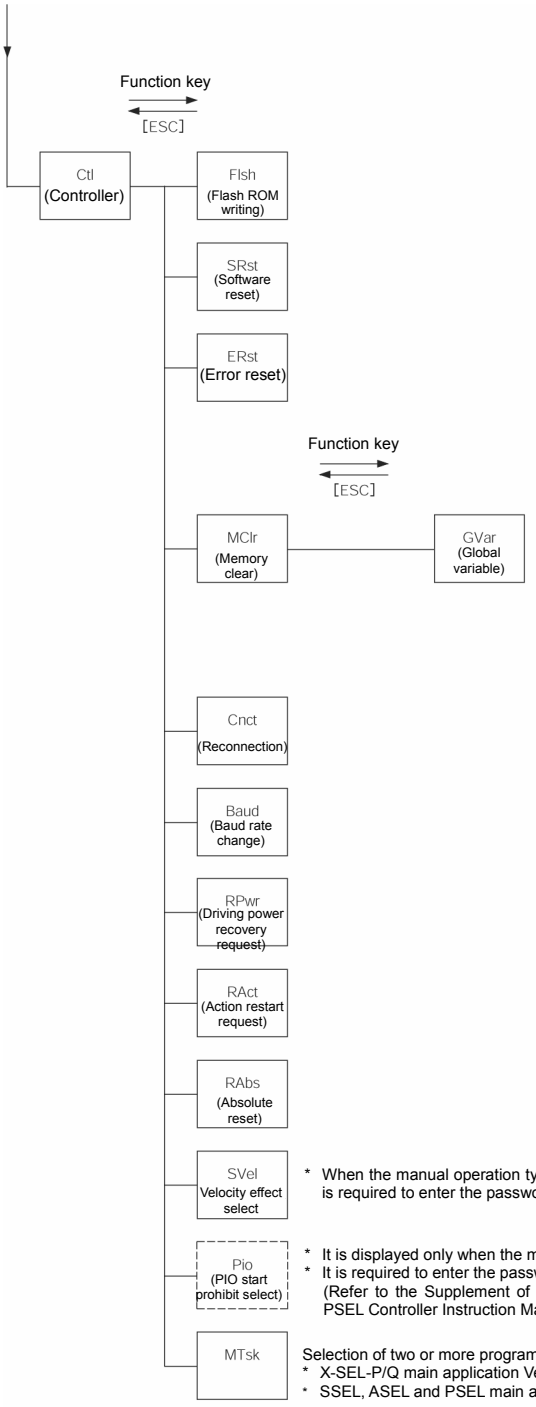
8-4-1. Program mode




Function key
[ESC]
Select the program No. and press return
[ESC]
Select the step No. and press return
[ESC]
Prog (Program)
Mdfy (Modify)
Step data input
* After writing data with [WRT], move to the next step
* Move to the symbol edit mode with "Sym"
Copy (Copy/Move)
Clr (Clear)
Select the symbol type with the function key
[ESC]
Sym (Symbol)
Symbol/ Definition value input
* After writing data with [WRT], move to the next edit No.
Select the parameter type with the function key
[ESC]
Para (Parameter)
Parameter input
* After writing data with [WRT], move to the next parameter No.
Function key
[ESC]
Select the program No. and press return
[ESC]
Move to the mode according to the current condition
Function key
[ESC]
1-axis, 2-axis
Play (Program operation)
Run (Execution)
[F1]
Strt (Continuous execution)
[F3] Stop
Stop (Execution stop)
[F2] Sus
[F1] Cont
[F2]
Step (Step execution)
[F3] Stop
[F2] Step
Posi (Current position)
LFlg (Local flag)
Function key
[ESC]
LVar (Local variable)
Itg (Integer variable)
Brk (Breakpoint setting)
Real (Real variable)
PErr (Program error display)
Str (String variable)
* Only during program stop
TSTS (Task status display)
Astop (All programs stop)


Function key
ESC
Moni
(Monitor)
In
(Input port)
Out
(Output port)
GFlg
(Global flag)
Function key
ESC
GVar
(Global variable)
Itg
(Integer variable)
Real
(Real variable)
Str
(String variable)
Function key
ESC
1-axis, 2-axis
ASts
(Axis status)
Posi
(Current position)
Srvo
(Servo status)
Snsr
(Sensor input status)
Ecdr
(Encoder status)
ErrA
(Axis-related error)


Function key
[ESC]
SSts (System status)
Mode (System mode)
Err (System error)
Sts1 (System status 1)
Sts2 (System status 2)
Sts3 (System status 3)
Sts4 (System status 4)
ErrL (Error list)
Function key
[ESC]
Ver (Version)
Main (CTL main)
Drv (Driver)
Tp (Teaching pendant)
FPGA
CTbl (Control constant)

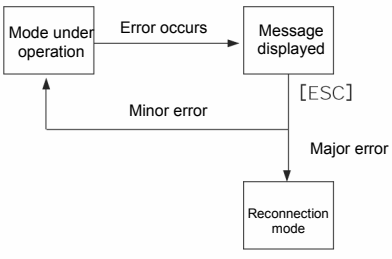


* When the manual operation type parameter equals edit and start selection (with password), it is required to enter the password at setting change time.

* It is displayed only when the manual operation type parameter equals edit and start selection (with password).
* It is required to enter the password at setting change time.
(Refer to the Supplement of “List of Parameters” and “8. Manual Operation Types” in the SSEL, ASEL and PSEL Controller Instruction Manual.)

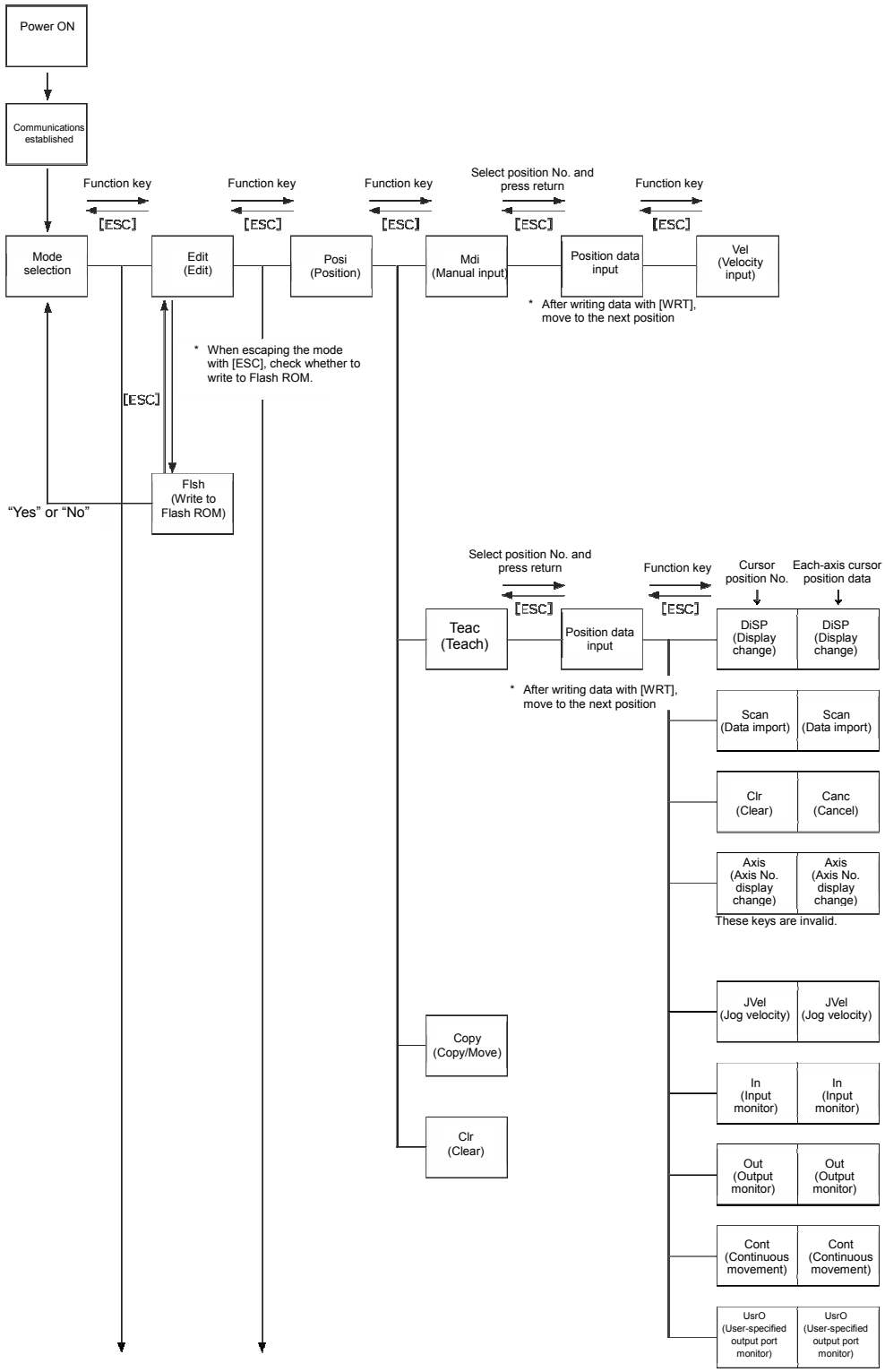
Selection of two or more programs start prohibition/permission
* X-SEL-P/Q main application Ver. 0.36 or later
* SSEL, ASEL and PSEL main application Ver. 0.01 or later

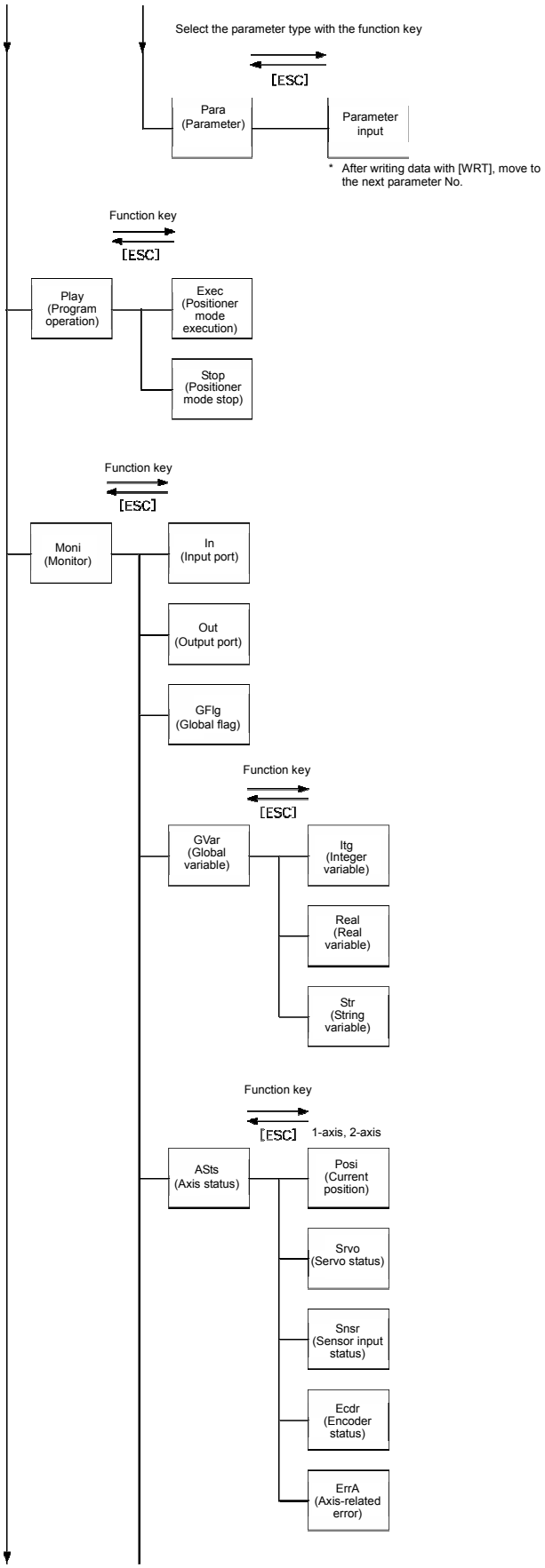
▪ Flow at Error Occurrence

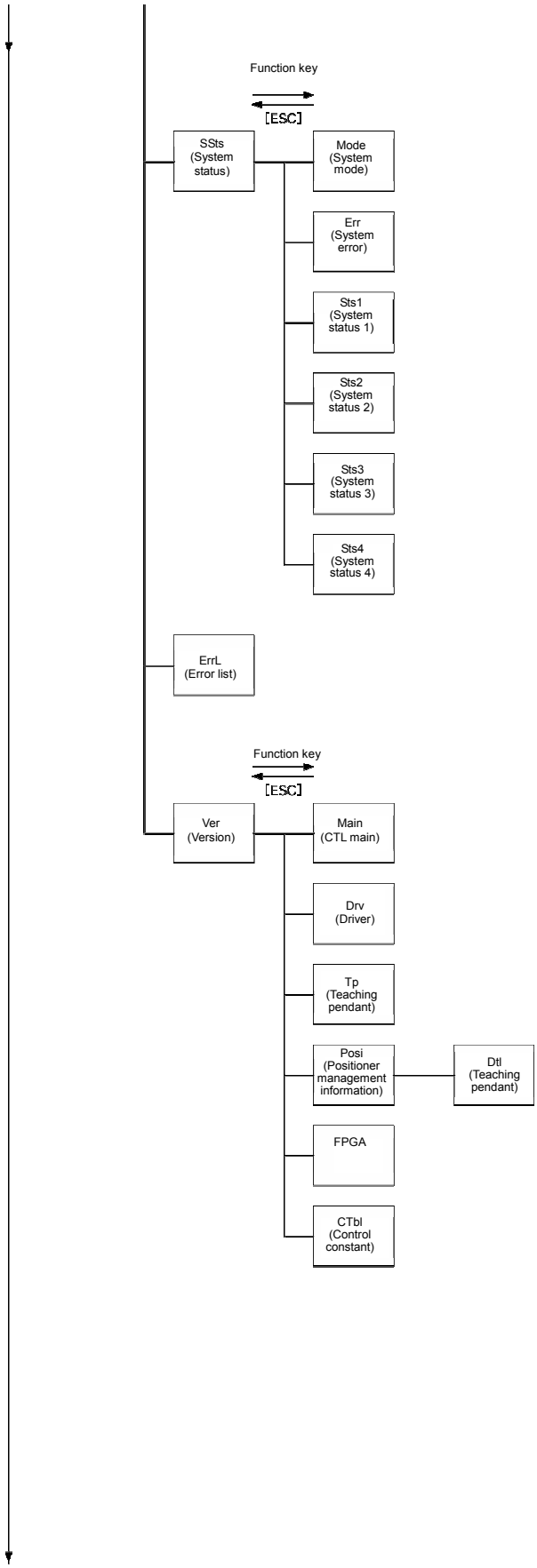


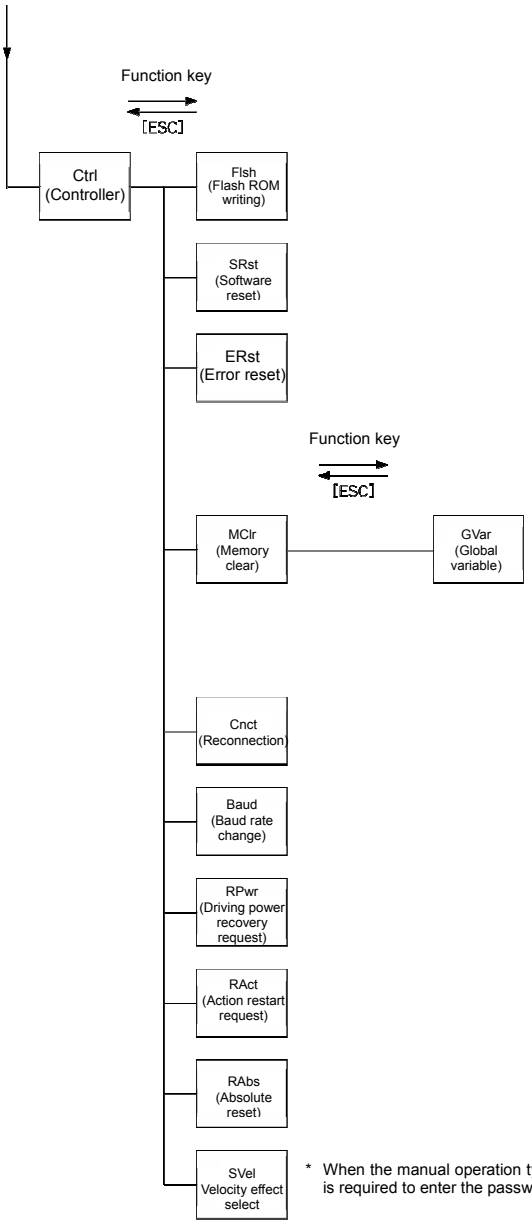
8-4-2. Positioner Mode

(Note) In the positioner mode, “program edit” or “symbol edit” is unavailable. “Two or more programs start prohibition” (MTsk) operation cannot be performed, either.

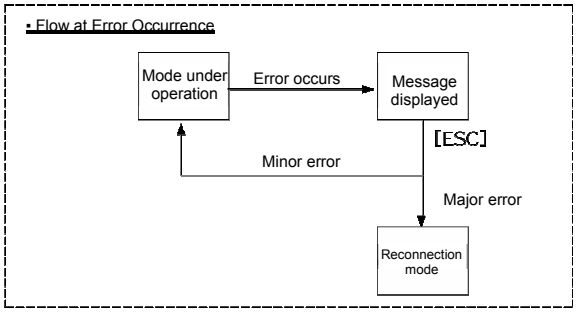



Select the parameter type with the function key
[ESC]
Para (Parameter)
Parameter input
* After writing data with [WRT], move to the next parameter No.
Function key
[ESC]
Play (Program operation)
Exec (Positioner mode execution)
Stop (Positioner mode stop)
Function key
[ESC]
Moni (Monitor)
In (Input port)
Out (Output port)
GFlg (Global flag)
Function key
[ESC]
GVar (Global variable)
Itg (Integer variable)
Real (Real variable)
Str (String variable)
Function key
[ESC]
1-axis, 2-axis
ASts (Axis status)
Posi (Current position)
Srvo (Servo status)
Snsr (Sensor input status)
Ecdr (Encoder status)
ErrA (Axis-related error)


Function key
[ESC]
SSts (System status)
Mode (System mode)
Err (System error)
Sts1 (System status 1)
Sts2 (System status 2)
Sts3 (System status 3)
Sts4 (System status 4)
ErrL (Error list)
Function key
[ESC]
Ver (Version)
Main (CTL main)
Drv (Driver)
Tp (Teaching pendant)
Posi (Positioner management information)
Dtl (Teaching pendant)
FPGA
CTbl (Control constant)



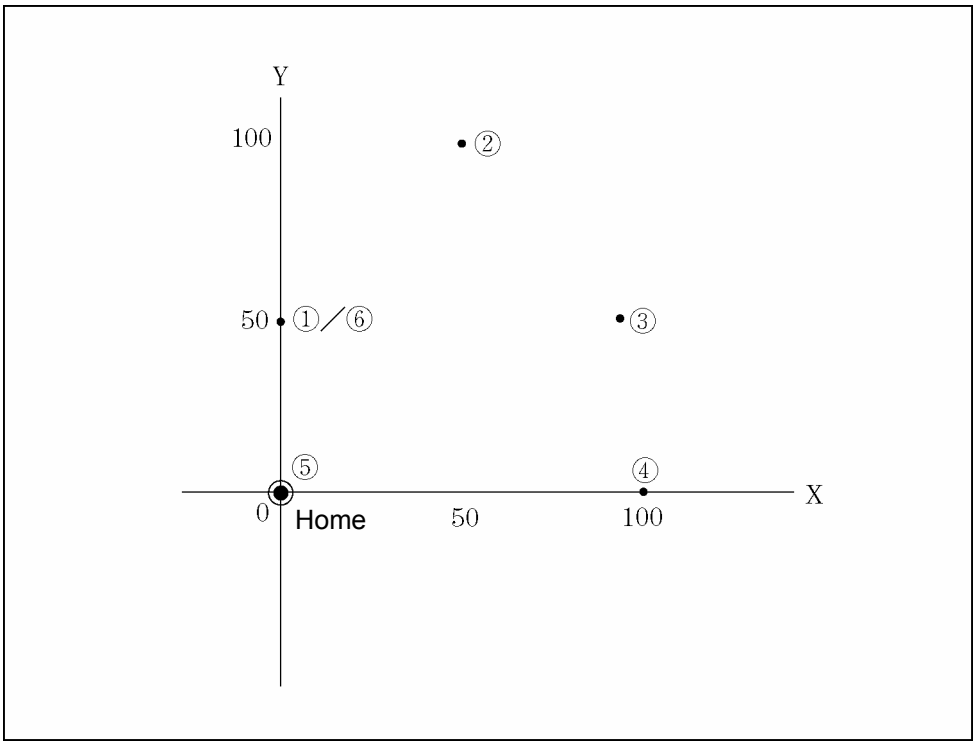
* When the manual operation type parameter equals edit and start selection (with password), it is required to enter the password at setting change time.



9. Simple Operation Procedure

9-1. Orthogonal Axis: 5th and 6th Axes of X-SEL-K, P/Q or PX/QX - TT, SSEL, ASEL or PSEL Controller

Here, the program and position data to draw a simple “pentagon” passing through the following 6 points (① and ⑥ are same position) by the actuator of 2 axes (X, Y) are created.



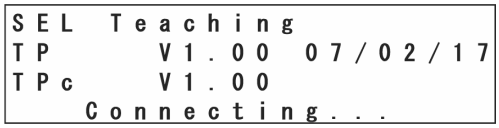
Position Data (① to ⑥)

9-1-1. Creation of Position Data

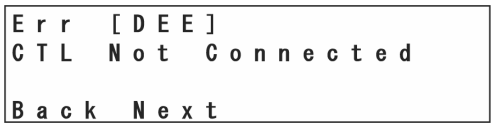
Input 6 points position data which can draw pentagon as the following position data list.

No.	Axis1	Axis2	Vel	Acc	Dcl
1	0.000	50.000	xxxx	x.xx	x.xx
2	50.000	100.000	xxxx	x.xx	x.xx
3	100.000	50.000	xxxx	x.xx	x.xx
4	100.000	0.000	xxxx	x.xx	x.xx
5	0.000	0.000	xxxx	x.xx	x.xx
6	0.000	50.000	xxxx	x.xx	x.xx

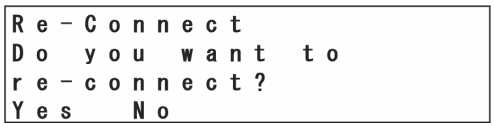
Connect the teaching pendant to the controller and turn on MODE switch to MANU side.
Supply the power to the controller.



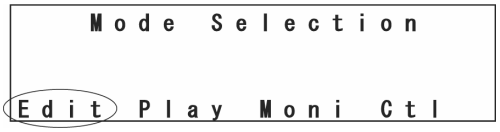
Display the version of the teaching pendant and move to the mode selection screen. (to the following page)



If the MODE switch is AUTO side, the teaching pendant does not connect to the controller and display as the screen on the left. Press ESC key to make it re-connection display.



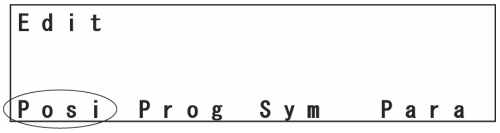
Turn on MODE switch to MANU side and press F1 (Yes) key to re-connect.



Mode Selection Screen

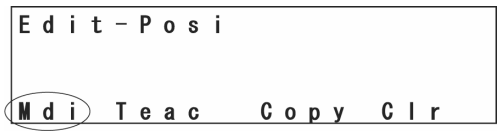
This is the basic screen for all operations.
Press the F1 key (Edit).

* If you make a wrong selection or input, press the ESC key and return to the previous screen. Then, you can continue operation. You can return to the basic screen by pressing the ESC key several times from any screen.



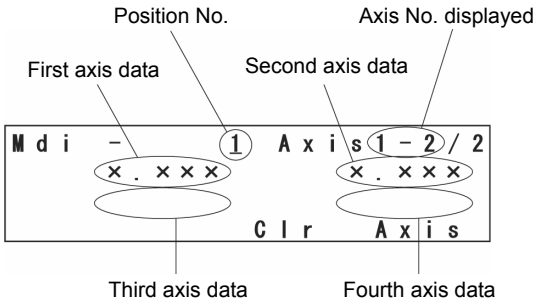
Edit Mode Screen

Press the F1 key (Posi).



Position (Position Data) Edit Screen

Press the F1 key (Mdi).



The above is the display of a 2 axis controller. Nothing displays in the 3rd and 4th axes data location.

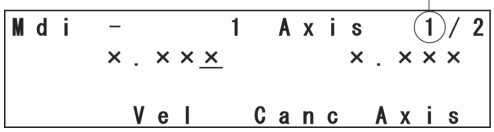
Position No. Input Mode

The cursor is placed at position No.
If there is no data, x.xxx will be displayed. Press the return key and place the cursor at first axis position data.

* If the data is already input , write over (original data is gone) or use the PAGE UP · PAGE DOWN keys to be placed at x.xxx and then input the data.
  Clear all axis input data by pressing the F3 (Clr) key and pressing the F1 (Clr) in the next screen. You can clear the controller data with (Clr) key even if the WRT key is not pressed.

When inputting the 5th and 6th axes data, press the F4 (Axis) key to switch the display to the 5th and 6th axes data display screen.
(The F4 (Axis) key is used to switch the 1st to 4th axes display screen to the 5th and 6th axes display screen.)

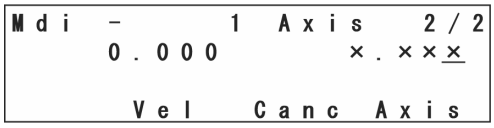
Axis No. on the cursor location



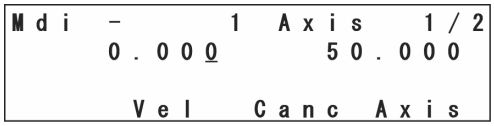
① Data input for the first point

Input 0 (number) and press the return key, 0.000 will be displayed and then the axis No. changes to 2 and the cursor position moves to the second axis position data.

* Position data can be input as 4 digit integer having 3 decimal places. This is the maximum amount and the range is different by actuator type, so, please check the catalogs.
* In the case of the 5th and 6th axes of X-SEL-PX/QX, press the F4 (Axis) key to select the 5th and 6th axes.



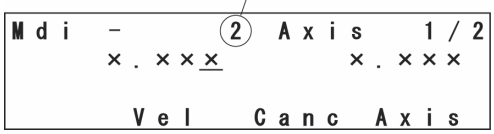
Input 50 at the second axis position data and press return key. (*Every press of return key, the cursor position moves. When you miss input, place the cursor to the miss input position and write over.)
Also you can return the input data to x.xxx with the F3 (Canc) key.



Transmit the data with the WRT key, position No. forwards 1 and becomes 2.

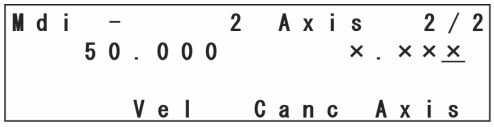
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

Position No. 2

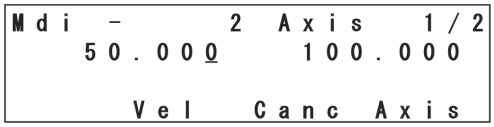


② Data input for the second point

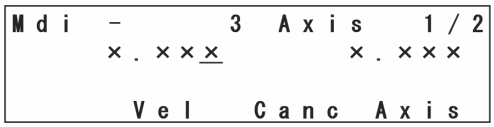
Input 50 on the first axis position data and press return key.



The cursor moves to the second axis position data. Input 100 and press return key.

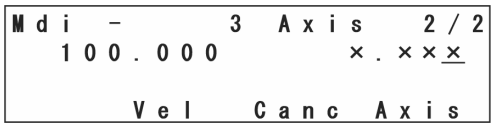


Transmit the data with the WRT key and move to position No. 3.

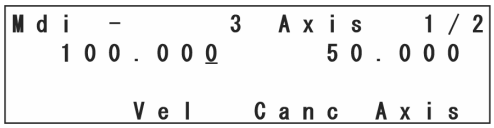


③ Data input for the third point

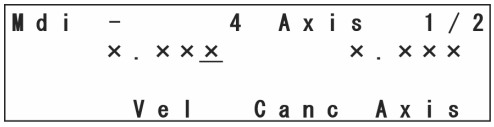
Input 100 for the first axis position data and press the return key.



Input 50 for the second axis position data and press return key.

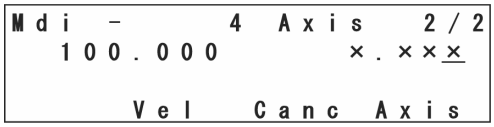


Transmit the data with the WRT key and move to position No. 4.

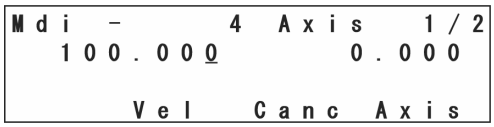


④ Data input for the fourth point

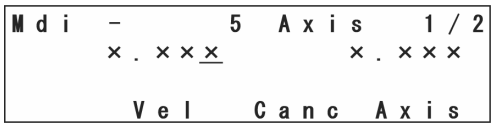
Input 100 for the first axis position data and press the return key.



Input 0 for the second position data and press the return key.

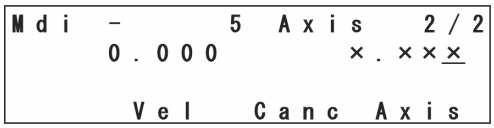


Transmit the data with the WRT key and move to position No. 5.

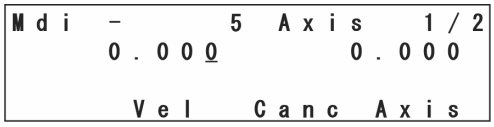


⑤ Data input for the fifth point

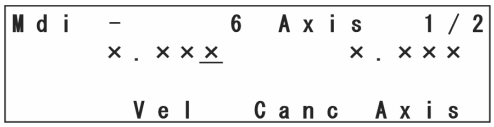
Input 0 for the first axis position data and press the return key.



Input 0 for the second axis position data and press the return key.

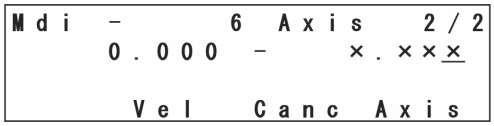


Transmit the data with the WRT key and move to position No. 6.

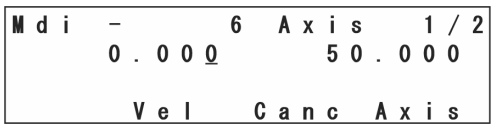


⑥ Data input for the sixth point

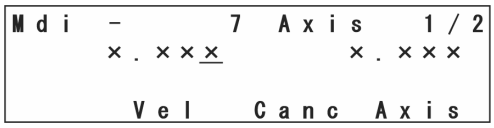
Input 0 for the first axis position data and press the return key.



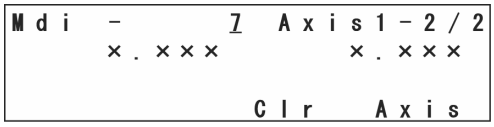
Input 50 for the second axis position data and press the return key.



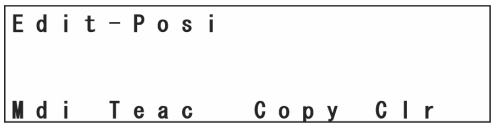
Transmit the data with the WRT key and move to position No.7.



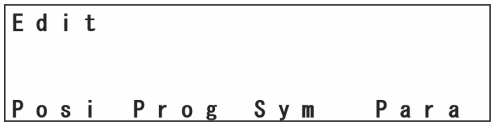
Finish editing, then write the data to Flash ROM.
The cursor moves to the position No. by pressing ESC key.



Return to the position edit screen by pressing the ESC key.



The edit mode screen will be appear by pressing the ESC key once more.



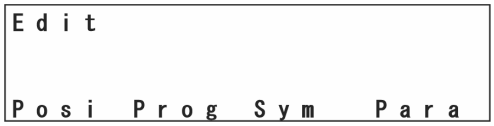
The Flash ROM writing screen will be appear by pressing the ESC key again.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Return to the edit mode screen by pressing the ESC key.



That’s all for inputting basic position data.

9-1-2. Programming

(Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

Here, make a program by changing the position of the position data created in section 9-1-1.

Application Program List

No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1				HOME	11			
2				VEL	100			
3				MOVL	1			
4				MOVL	2			
5				MOVL	3			
6				MOVL	4			
7				MOVL	5			
8				MOVL	6			
9				EXIT				

This is the X-SEL program that was created in this chapter.

For the details of each command, please refer to the operating manual that comes with the controller.

Here, only input Cmnd (command) and Operand1 (operation 1) columns are used.

Caution for the HOME command:

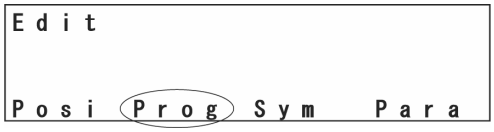
For restart after homing temporary stop, execute it from the beginning of the homing sequence.

The homing operation of the ABS encoder axis becomes the movement to the multi-rotation data reset position.

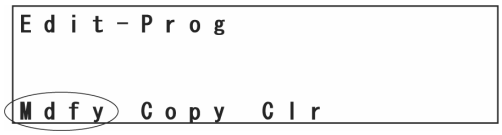
When operation is reset during its execution in a mode other than the absolute reset mode of the PC compatible software/Teaching Pendant, the “real position soft limit error” may occur depending on the position. It is not recommended to execute homing at times other than during adjustment time of the absolute encoder axis.

Use the HOME command only for the increment specification.

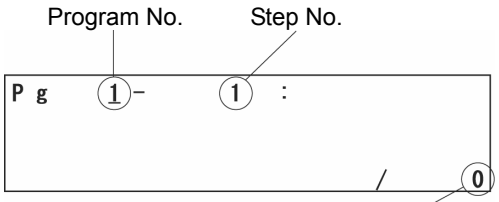
Select the F1 key (Edit) at the mode selection screen.



Select the F2 key (Prog) at the Edit Mode screen.



Select the F1 key (Mdfy) on the program edit and new creation screen.



Change to the program No. input mode screen. The cursor is located at the program No. Move the cursor to the step No. with return key.

* If the program data is already input, write over (the data will be gone) or select the program No. which has no program data. The cursor location on program No. or step No. can be changed with PAGE UP · PAGE DOWN keys.

Also, you can change the program No. and step No., by pressing the return key after the 10 key input.

```
Pg   1-    1  :

Ins   Del   Cmnt  /    0
```

The Cursor moves to the appropriate step No. Press the return key.

```
Pg   1-    1  :
_
ABPG  ACC   ACHZ  ADD  →
```

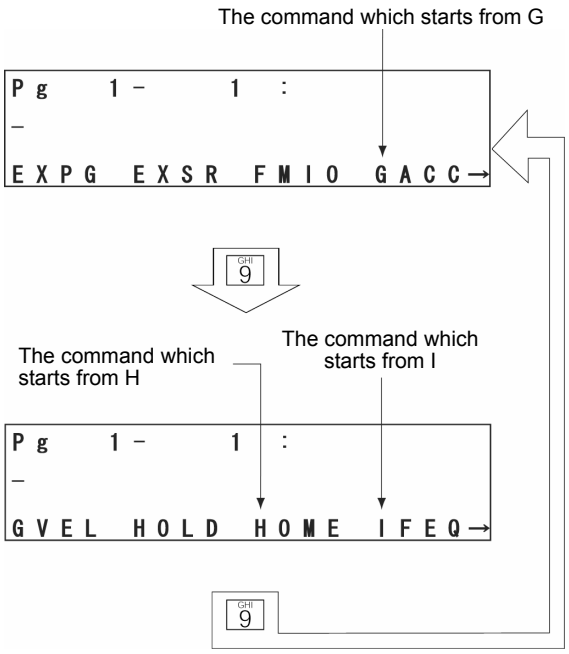
Input commands.

Commands are displayed in the function key area.

How to search the command

① When the cursor is located at commands input locations, commands are displayed in alphabetical order by pressing SF key. They are displayed in reverse order by pressing . key.

② Alphabets are allocated on 10 keys. (ex. GHI are allocated to 9.) When the cursor is located at command input location, display the first command word which starts with each alphabet in the function key area each time by pressing the 10 key.
As shown in the diagram at the left, the initial GXX and other keys such as GACC, HOME and IFEQ are displayed in any of F1 to F4 function key section.
Display the command you would like to input in the function key area with the steps of ① and ② above and press the corresponding function key.

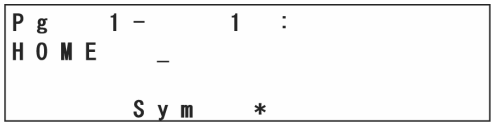


How to search the command, HOME

The commands which start with G, H, or I will be displayed by pressing the 9 key of the 10 keys. (Some commands can't be displayed by pressing one of the 10 keys. In this case, press the SF (shift) key and one of the 10 keys for more option.)

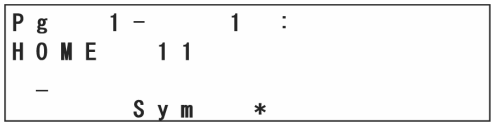
```
Pg   1-    1  :
HOME
GVEL  HOLD  HOME  IFEQ→
```

Display HOME in the function key area and press the F3 key (HOME). (If you want to backspace previous operation, press BS key.)
Press the return key.



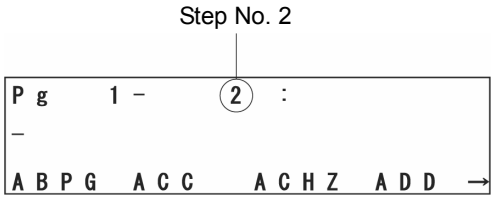
The cursor moves to operation 1.
Input 11 and press the return key.

When you redo an input
Move the cursor where you want to redo an input by pressing the ◀ ▲ ▼ ▶ key and return key. Write over or delete with BS (backspace) key. Or redo from step No. by using ESC key.

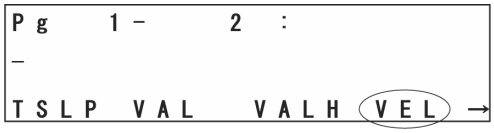


Transmit data key to the controller by pressing the WRT key. Step No. moves to 2.

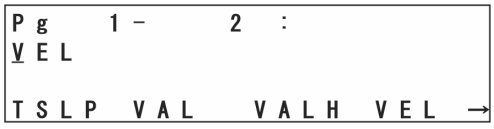
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



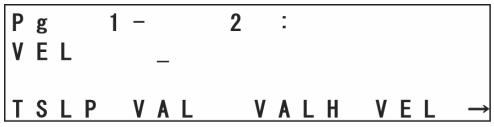
Press the 10 key, 2 or SF (shift) key and ⁻/. key to search VEL.



Select the F4 key (VEL).

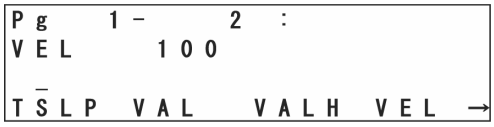


Press the return key.



Here, input the velocity* as 100, and press the return key.

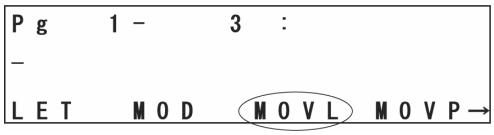
* Check the maximum velocity listed in the catalogs. When velocity is input into position data, priority is given there.



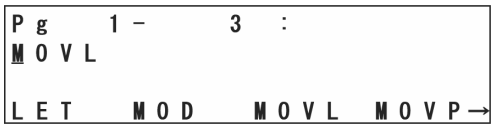
Transmit the data to the controller by pressing the WRT key.
The cursor moves to step No. 3.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

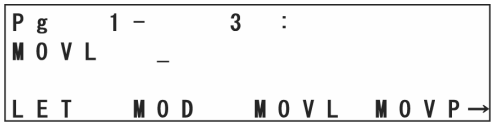
By using the 5, SF and . keys, this will display the MOVL.



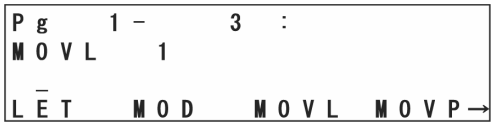
Select the F3 key (MOVL).



Press the return key.
The cursor moves to operation 1.

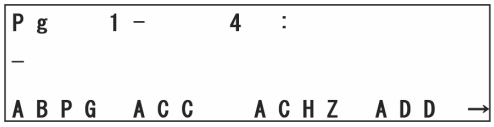


Input 1 on position No. and press the return key.

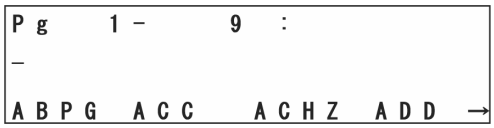


Transmit the data to the controller by pressing the WRT key.
The cursor moves to step No.4.

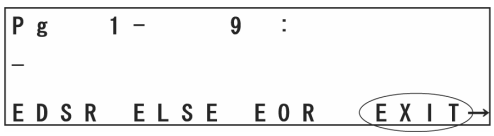
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



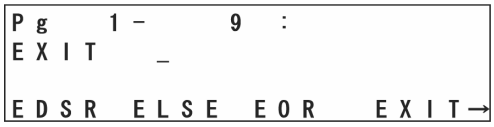
Input MOVL 2 ~ MOVL 6 program data into steps No. 4 ~ 8 by the same procedure and transmit the data to the controller.



Display EXIT in the function key area by using the 8, SF and . keys.

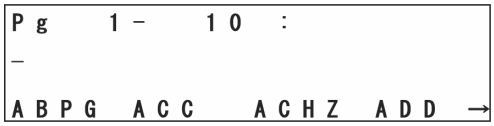


Select the F4 key (EXIT) and press the return key.

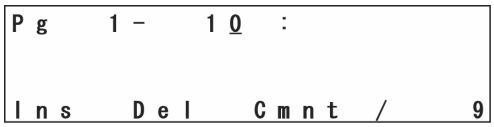


Transmit the data to the controller by pressing the WRT key.

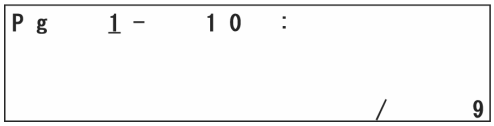
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



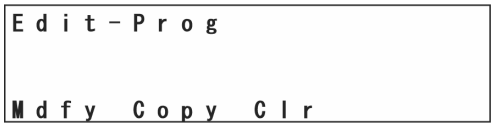
Finish editing the program and write the data to Flash ROM.
Press the ESC key.
(The cursor moves to the step No.)



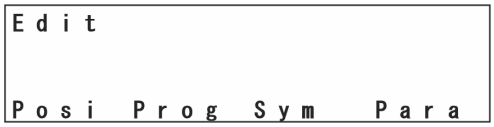
Press the ESC key.
(The cursor moves to the program No.)



Press the ESC key.
Return to the program edit screen.



Press the ESC key.
Return to the edit mode screen.



Press the ESC key.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

During Flash ROM writing, “Please Wait....” blinks.

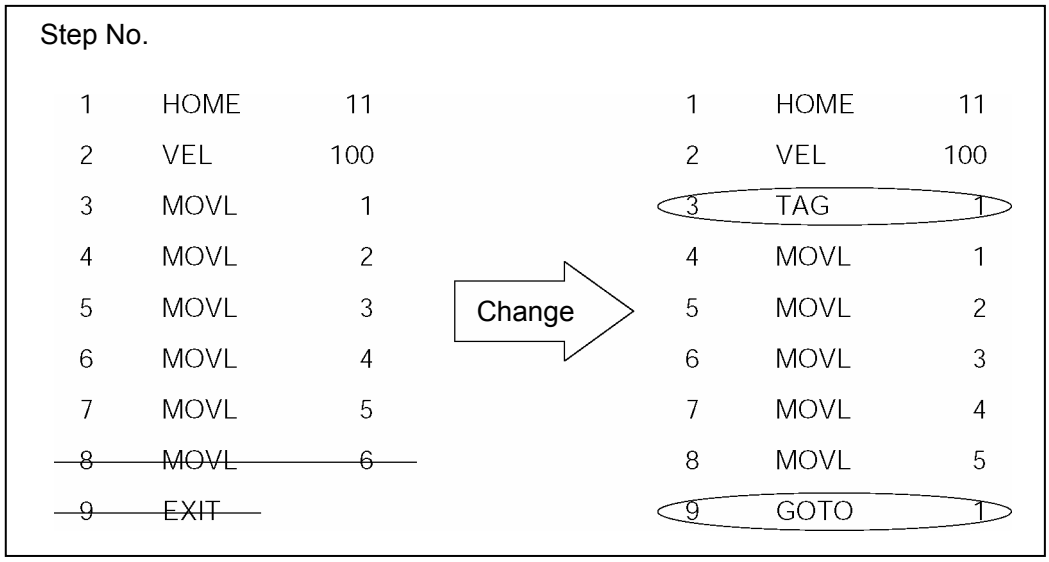
*** Never shut off the power to the controller during Flash ROM writing.**

Flash ROM writing is complete.
Return to the edit mode screen with the ESC key.

9-1-3. Changing Application Program
(Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

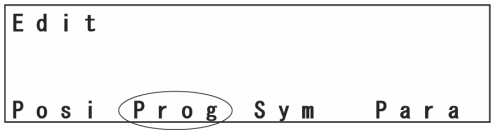
Change the program you made in the previous section (9-1-2).

Insert and delete the program step to allow the same action to be repeated.

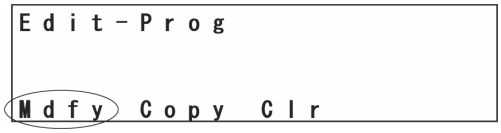


(Insert “TAG 1” into step No.3, delete the line which displays “MOVL 6,” and write over “GOTO 1” **replacing** it with “EXIT.”)

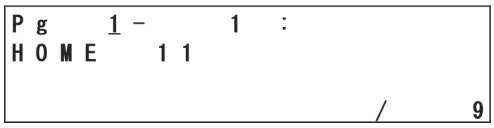
Select the F1 key (Edit) on the mode selection screen.



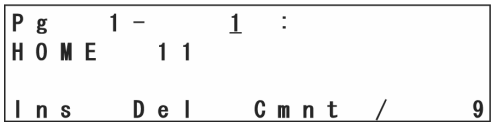
Press the F2 key (Prog) on the edit mode screen.



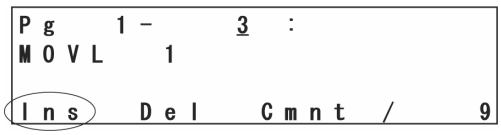
Select the F1 key (Mdfy) on the program edit and new creation screen.



Change to the program edit and new creation screen. Press the return key once and position the cursor at the step No.

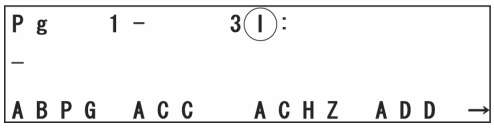


Insert a 1 line step between step No. 2 and 3. Input 3 by pressing “3” or display 3 by pressing the PAGE UP key twice.

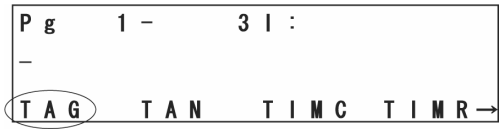


Select the F1 key (Ins).

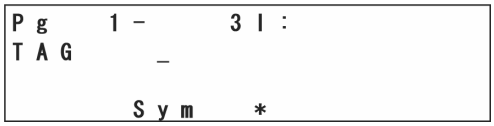
I, Insert of I will be displayed after step No. 3.



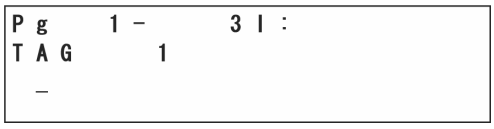
Display “TAG” by using the STU 1 in the 10 key, SF key or . key.



Select the F1 key (TAG) and press the return key.

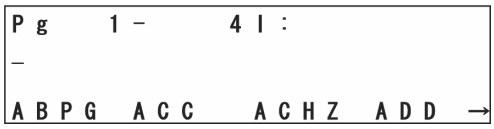


Input 1 into operation 1 and press the return key.

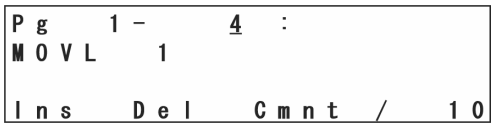


Transmit the data to the controller by pressing the WRT key.

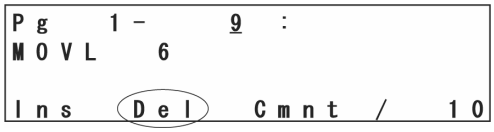
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



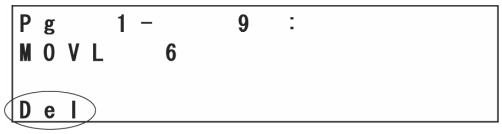
Display the step No. 4 screen by pressing the ESC key twice.



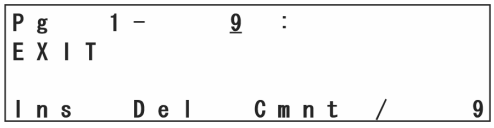
Delete the “MOVL 6.” Input 9 for the step No. by pressing the 9 key directly to the same cursor location or display the “MOVL 6” by pressing PAGE UP key 5 times.
(The cursor is located at step No.9.)



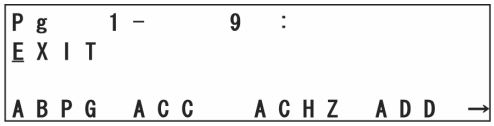
Press the F2 key (Del).



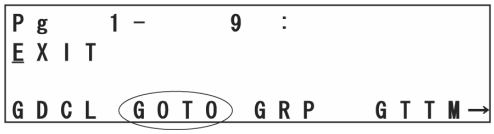
Press the F1 key (Del) one more time.
(If you wish to cancel deleting, press the ESC key.)



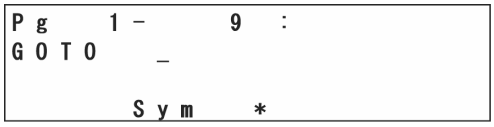
Press the return key.



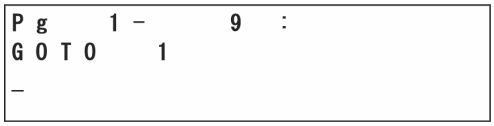
Display “GOTO” by using the 9 in the 10 key, SF key or . key.



Select the F2 key (GOTO) and press the return key.

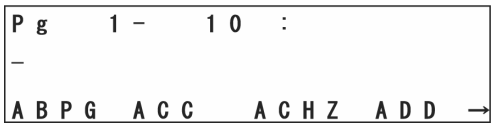


Input the same value you input at “TAG” operation 1 on operation 1. Here, input 1 and press the return key.



Transmit the data to the controller by pressing the WRT key.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



Press the ESC key several times and move to the Flash ROM writing screen.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

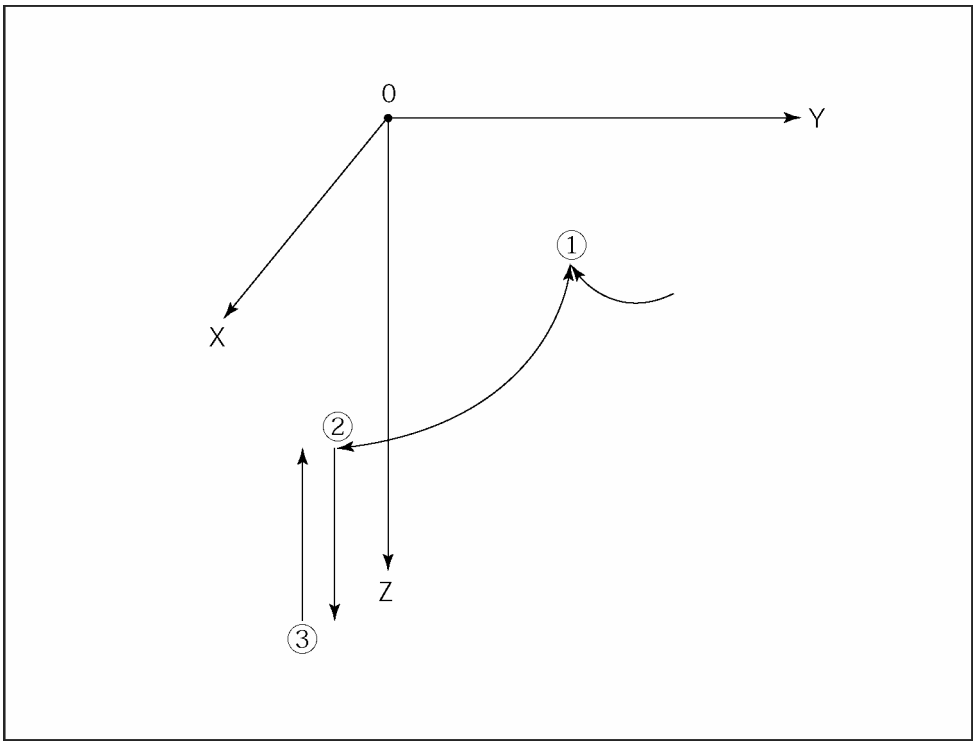
During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Flash ROM writing is complete.
Return to the edit mode screen with the ESC key.

9-2. Simple Operating Procedures

Create a program and position data.



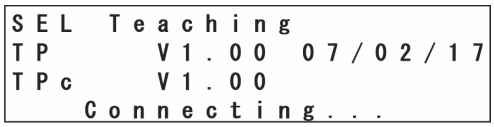
Position Data (① to ③)

9-2-1. Creation of position data

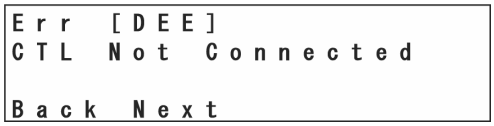
Input the position data of 3 points as shown in the position data list below.

No.	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dcl
1	0.000	300.000	0.000	0.000			
2	200.000	225.000	0.000	90.000			
3	x.xxx	x.xxx	150.000	x.xxx			

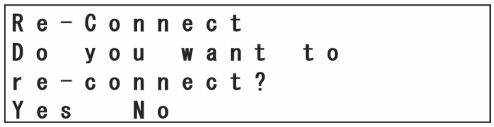
Connect the Teaching Pendant to the controller and flip the MODE switch to MANU.
Turn on the power to the controller.



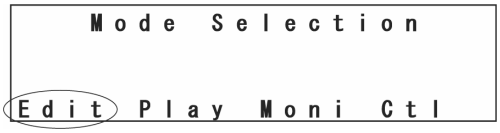
The version of the Teaching Pendant is displayed and the screen moves to the Mode Selection screen. (To the following page)



When the MODE switch is flipped to AUTO, the Teaching Pendant is not connected to the controller and the screen at the left is displayed. Press the ESC key to make it a reconnection display.



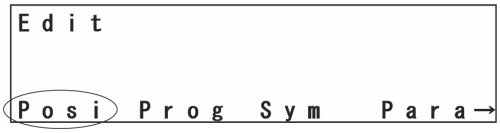
Flip the MODE switch to MANU, and press the F1 (Yes) key for reconnection.



Mode Selection screen

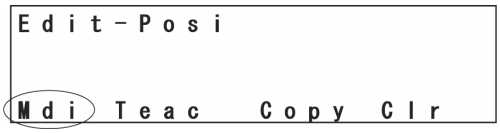
This screen becomes the basic screen for all operations.
Press the F1 (Edit) key.

* If you make a wrong selection or input, press the ESC key and return to the previous screen. Then, you can continue operation. You can return to the basic screen by pressing the ESC key several times from any screen.



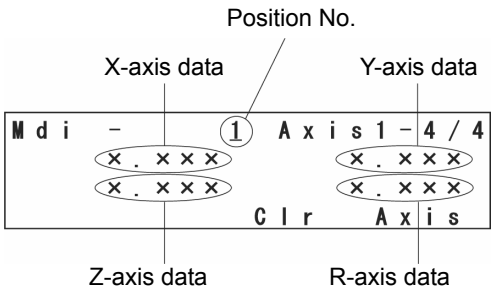
Edit mode screen

Press the F1 (Posi) key.



Edit-Posi (position data edit) screen

Press the F1 (Mdi) key.

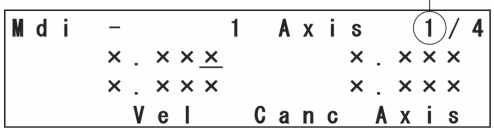


Position No. input mode

The cursor is located at the position No.
When no data is input, X.XXX is displayed. Press the return key to move the cursor to the section of the position data for the X-axis.

* When data is already input, overwrite it (the original data is lost) or use the PAGE UP and PAGE DOWN keys to move to the screen with X.XXX displayed and input data.
If you press the F3 (Clr) key and then F1 (Clr) key, all axis input data will be cleared. You can clear the controller data with the (Clr) key even if the WRT key is not pressed.

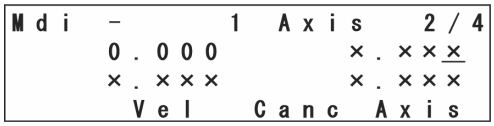
Axis No. at the cursor location



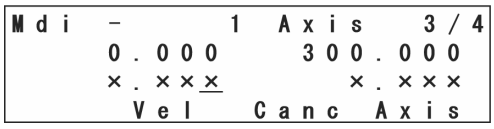
① Data input for 1st point

Enter a numerical value of 0 and press the return key. 0.000 is displayed, the axis No. changes to 2, and the cursor moves to the section for the Y-axis position data.

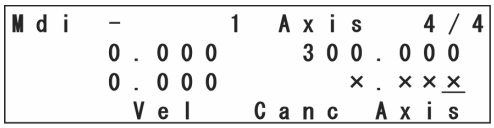
* The position data can be input up to a 4-digit integral number and three digits to the right of the decimal. Since the range varies according to the actuator's model, check it in the catalog etc.



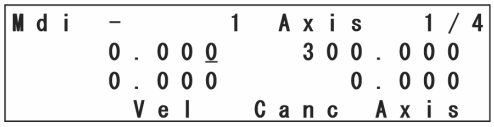
Enter 300 for the Y-axis position data and press the return key. (* Every time the return key is pressed, the cursor position moves. With every press of the ◀ ▲ ▼ ▶ key, the cursor position moves. When you make an input error, move the cursor to the location where you have made the error and overwrite the data.)
The input data can also be returned to X.XXX with the F3 (Canc) key.



Enter 0 for the Z-axis position data and press the return key.



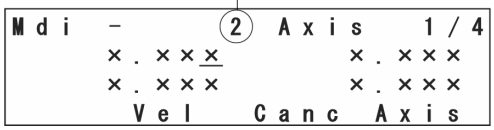
Enter 0 for the R-axis position data and press the return key.



When the data is transferred with the WRT key, the position No. is incremented by 1 and becomes 2.

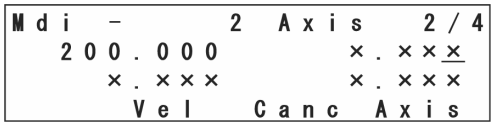
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.

Position No. 2

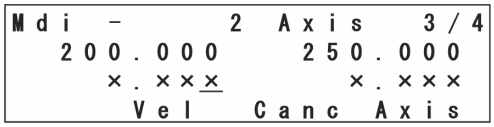


② Data input for 2nd point

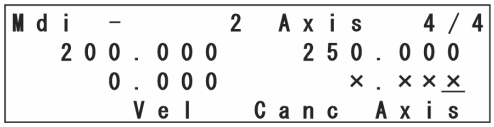
Enter 200 for the X-axis position data and press the return key.



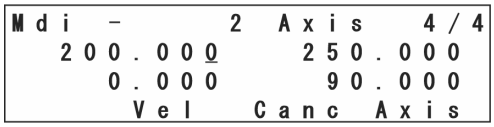
The cursor moves to the section for the Y-axis position data. Enter 250 and press the return key.



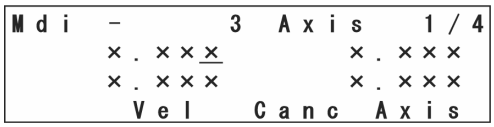
Enter 0 for the Z-axis position data and press the return key.



Enter 90 for the R-axis position data and press the return key.

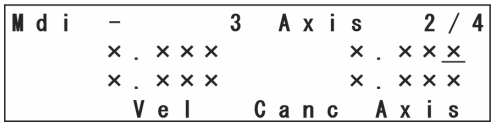


Transfer the data with the WRT key and advance the position No. to 3.

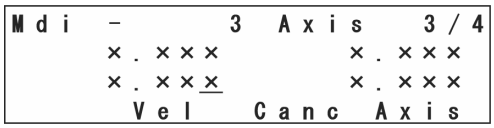


③ Data input for 3rd point

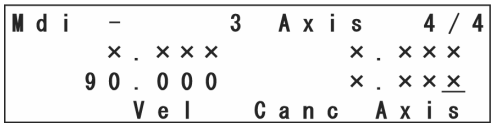
Press the return key since the X-axis position data is left blank.



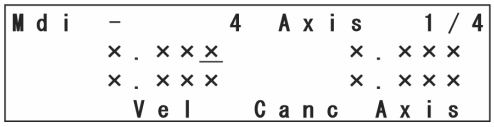
Press the return key since the Y-axis position data is also left blank.



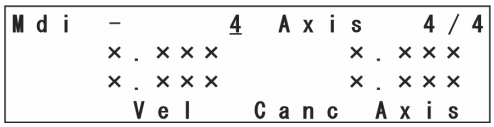
Enter 90 for the Z-axis position data and press the return key.



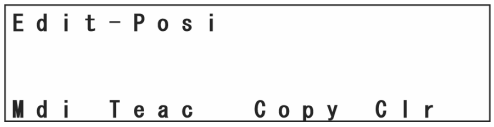
Transfer the data with the WRT key and advance the position No. to 4.



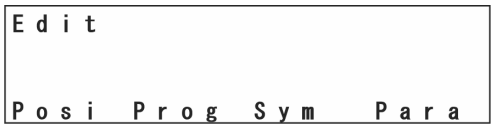
Complete position editing and write the data in Flash ROM.
Pressing the ESC key moves the cursor to the location of the position No.



Pressing the ESC key returns the screen to the Edit-Posi screen.



Pressing the ESC key again moves to the Edit mode screen.



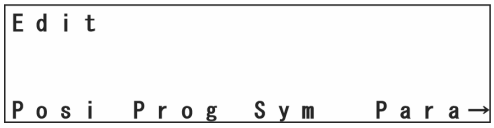
Pressing the ESC key once more moves to the Flsh screen.

To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the Controller at this time.

Flash ROM writing is completed.
Return to the edit mode screen by pressing the ESC key.



With the above, input of the basic position data is completed.

9-2-2. Creation of program

The program to move the position data created in 9-2-1. is created.

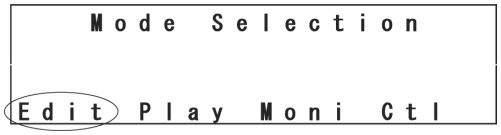
Application Program List

No.	n	Cnd	Cmnd	Operand 1	Operand 2	Pst
1			ACCS	50		
2			DCLS	50		
3			VELS	100		
4			PTPL			
5			MOVP	1		
6			MOVP	2		
7			MOVP	3		
8			MOVP	2		
9			MOVP	1		
10			EXIT			

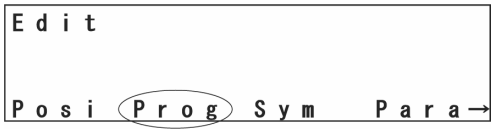
In this section, the X-SEL program is input.

For further information on the meaning and usage of each command, refer to the Instruction Manual attached to the controller.

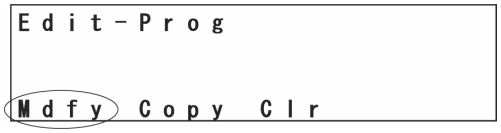
Only Cmnd (command) and Operand1 (operation 1) are input here.



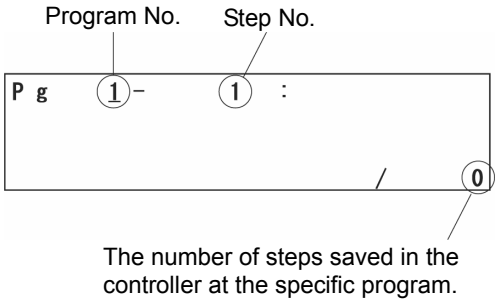
Select the F1 (Edit) key on the Mode Selection screen.



Select the F2 (Prog) key on the Edit mode screen.



Select the F1 (Mdfy) key on the Edit-Prog (program edit and new creation) screen.

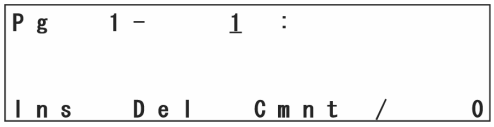


The screen changes to the program No. input mode screen. The cursor is located at the program No. Press the return key to move the cursor to the location of the step No.

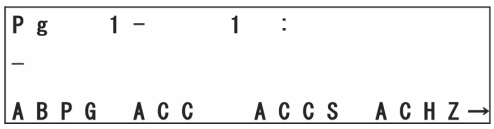
* When the program's data is already input, overwrite it (the original data is lost) or select the program No. with no data input. The program No. or step No. over which the cursor is located can be changed with the PAGE UP and PAGE DOWN keys. In addition, pressing the return key after inputting a numerical value with the 10 key can change the program No. or step No.

Also, you can change the program No. by pressing the return key after the 10 key input. If the return key is pressed, the cursor will move to the step No. Then, the program No. can be changed with the PAGE UP・PAGE DOWN keys.

You can also input it directly by using the 10 keys.



The cursor has moved to the location of the step No.
Press the return key.



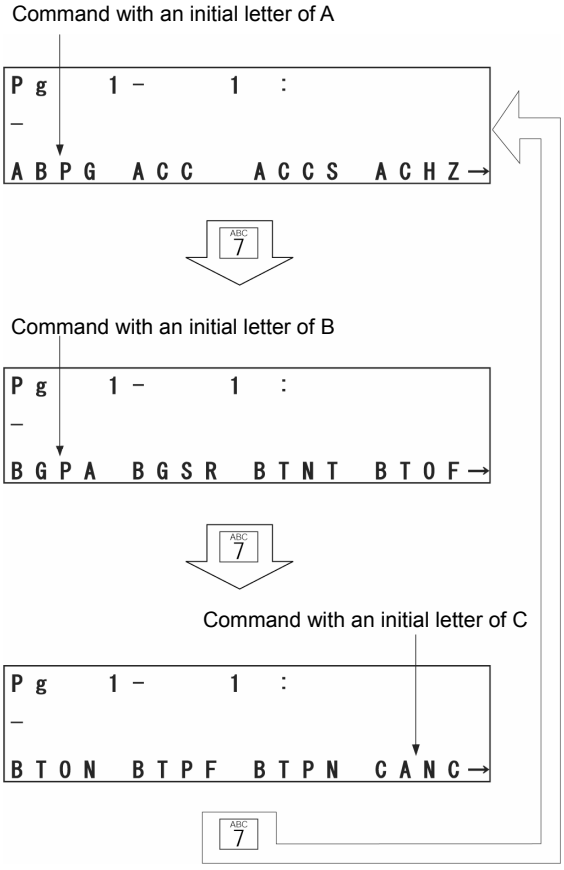
Enter commands.

Commands are displayed in the function key section.

Command search method

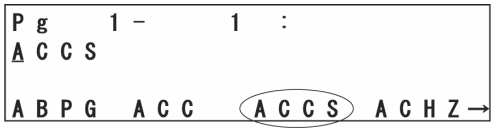
① When the cursor is at the location for command input, pressing the SF key displays commands in alphabetical order. They are displayed in reverse order by pressing the . key.

② Letters/alphabetic letters are located for each of the 10 key (such as ABC allocated to the 7 key). Every time a key of the 10 key is pressed when the cursor is located at the command input section, the first command of which the initial letter is the relevant alphabetic letter is displayed in the function key section.
However, as shown in the diagram at the left, the initial AXX key and other keys such as ABPG, BGPA and CANC are displayed in any of F1 to F4 function key section.
Display the command for input in the function key section with the steps of ① and ② above and press the corresponding function key.

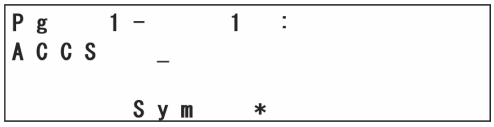


Search for command ACCS

Pressing the 7 key displays the commands with the initial letters of A, B, and C. (Some commands cannot be displayed only by pressing a key of the 10 key. In such cases, display the command by using the ten-key, SF key and . key.

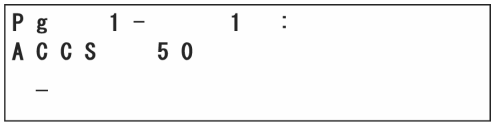


After displaying ACCS in the function key section, press the F3 (ACCS) key. (To return the command input field to blank, press the BS key.)
Press the return key.



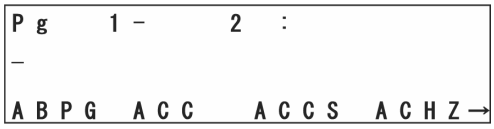
The cursor moves to operation 1. Set 50% of the maximum PTP acceleration.
Enter 50 and press the return key.

To reattempt input:
Move the cursor to the change location with the ◀ ▲ ▼ ▶ or return key.
Overwrite the data or delete it with the BS key.
Or, reattempt from the step No. with the ESC key.

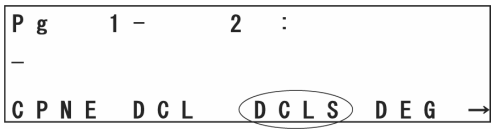


Press the WRT key to transfer the data key to the controller. The step No. advances to 2.

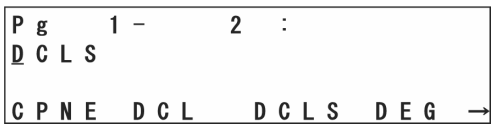
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



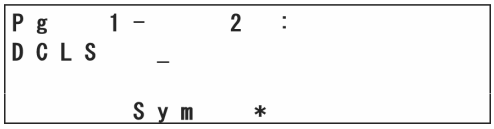
Press 8 of the 10 key, the SF key or . key to search DCLS.



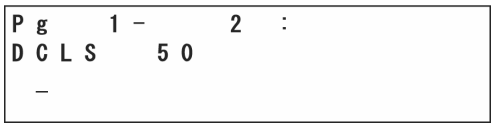
Select the F3 (DCLS) key.



Press the return key.

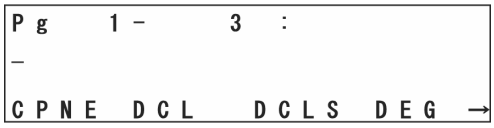


Set 50% of the maximum PTP deceleration.
Enter 50 and press the return key.

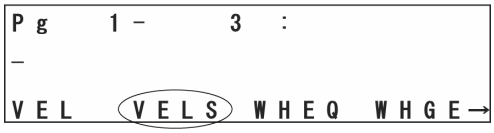


Press the WRT key to transfer the data to the controller.
The step No. advances to 3.

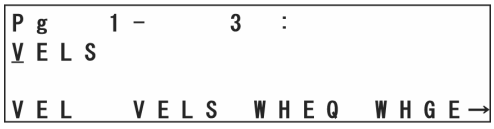
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



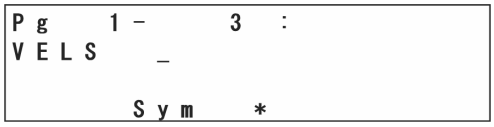
Display VELS with 2 of the 10 key twice.



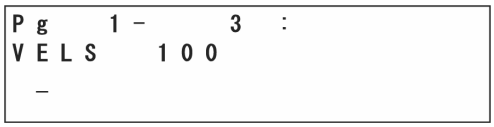
Select the F2 (VELS) key.



Press the return key.
The cursor moves to operation 1.

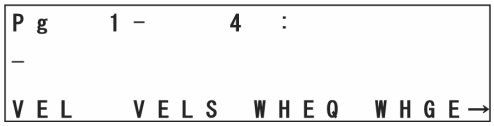


Set 100% of the maximum PTP velocity.
Enter 100 and press the return key.



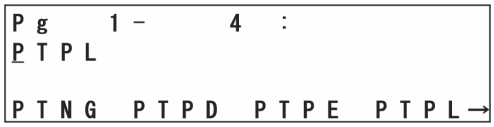
Press the WRT key to transfer the data to the controller.
The step No. advances to 4.

* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.

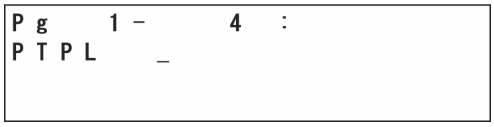


Display PTPL with POR 6 of the 10 key, the SF key or . key.

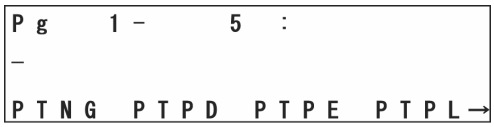
Select the F4 (PTPL) key.



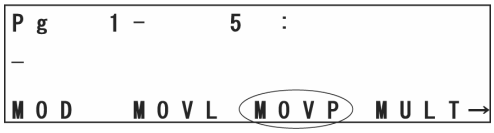
Press the return key.



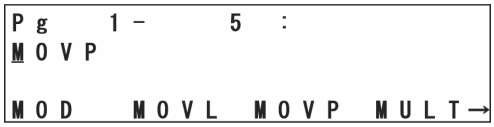
Press the WRT key to transfer the data to the controller.
The step No. advances to 5.



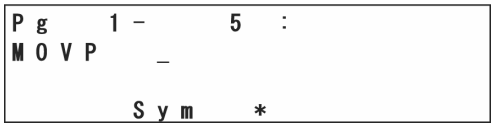
Display MOVP with 5 of the 10 key.



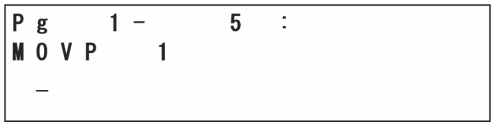
Select the F3 (MOVP) key.



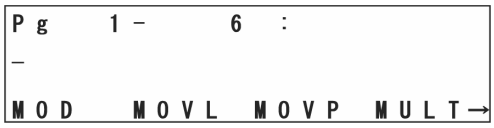
Press the return key.
The cursor moves to operation 1.



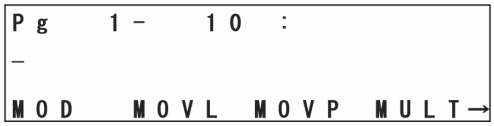
Enter 1 of the position No. 1 and press the return key.



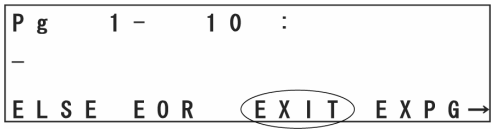
Press the WRT key to transfer the data to the controller.
The step No. advances to 6.



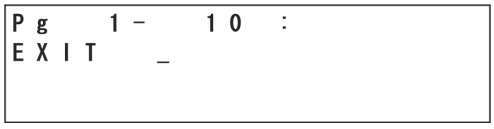
Input the program data of MOVP 2, MOVP 3, MOVP 2 and MOVP 1 for the steps No. 6 to No. 9 according to the same procedures and transfer the data to the controller.



Display EXIT in the function key section with DEF 8 of the 10 key, the SF key or the . key.

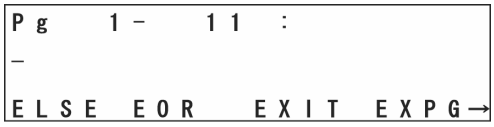


Select the F3 (EXIT) key and press the return key.

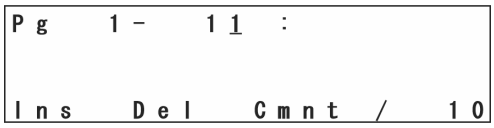


Press the WRT key to transfer the data to the controller.

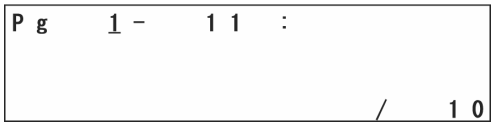
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



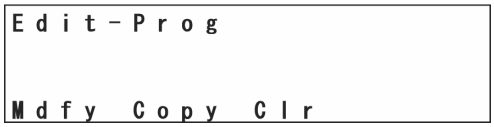
Complete the program editing and write the data in Flash ROM.
Press the ESC key.
(The cursor moves to the location for step No.)



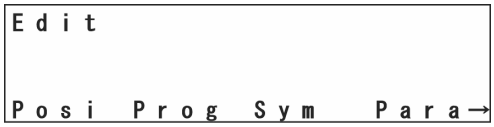
Press the ESC key.
(The cursor moves to the location for program No.)



Press the ESC key.
Return to the Edit-Prog screen.



Press the ESC key.
Return to the Edit mode screen.



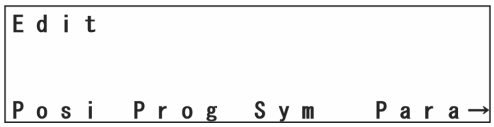
Press the ESC key.

To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the controller at this time.

Flash ROM writing is completed.



Return to the edit mode screen by pressing the ESC key.

9-2-3. Change of application program

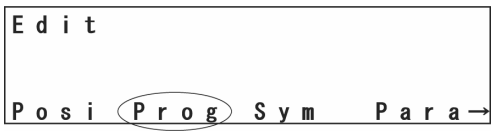
The program created in the preceding section (9-2-2) is changed.

A program step is inserted or deleted to allow the same operation to be repeated.

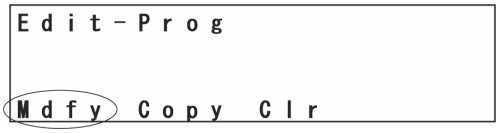
Step No.						
1	ACCS	50		1	ACCS	50
2	DCLS	50		2	DCLS	50
3	VELS	100		3	VELS	100
4	PTPL			4	PTPL	
5	MOVP	1	Change	5	TAG	1
6	MOVP	2		6	MOVP	1
7	MOVP	3		7	MOVP	2
8	MOVP	2		8	MOVP	3
~~9~~	~~MOVP~~	~~1~~		9	MOVP	2
~~10~~	~~EXIT~~			10	GOTO	1

(Insert “TAG 1” into step No. 5, delete “MOVP 1” from step No. 9 and overwrite “EXIT” with “GOGO 1.”)

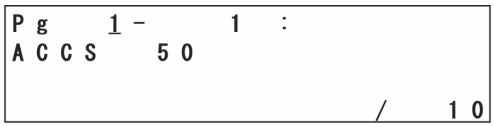
Select the F1 (Edit) key on the Mode Selection screen.



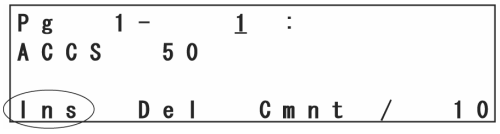
Press the F2 (Prog) key on the Edit mode screen.



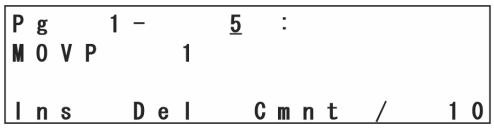
Select the F1 (Mdfy) key on the Edit-Prog and new creation screen.



The display changes to the Edit-Prog and new creation screen. Press the return key once to move the cursor to the location for step No.

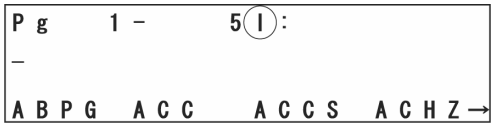


Insert one-line step between the program steps No. 4 and No. 5. Enter 5 with the 10 key or press the PAGE UP key 4 times to display 5.

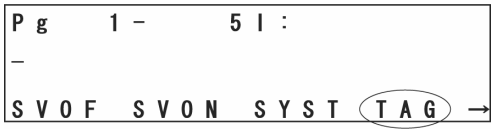


Select the F1 (Ins) key.

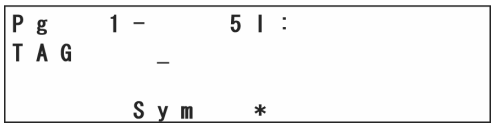
"I" of "Insert" is displayed after step No. 5.



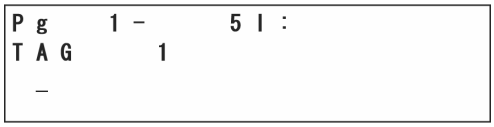
Display "TAG" with 1 of the 10 key, SF key or . key.



Select the F4 (TAG) key and press the return key.

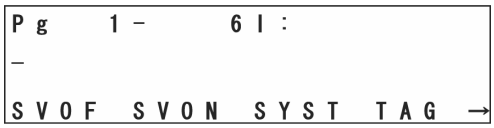


Enter a numerical value of 1 for operation 1 and press the return key.

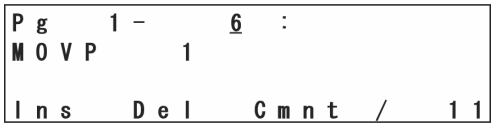


Press the WRT key to transfer the program data to the controller.

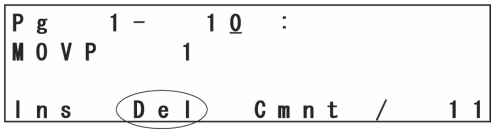
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



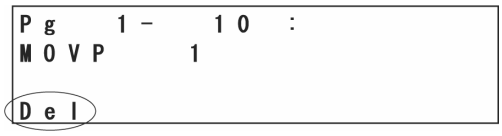
Press the ESC key twice to display the screen for step No. 6.



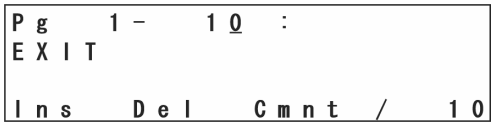
Then, delete “MOVP 1” from pre-modification step No. 9. Enter 10 for the step No. directly with the 10 key while keeping the cursor position, or press the PAGE UP key 4 times to display “MOVP 1.”
(Cursor located at step No. 10)



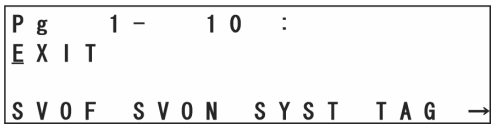
Press the F2 (Del) key.



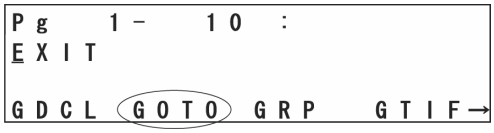
Press the F1 (Del) key again.
(When canceling deletion, press the ESC key.)



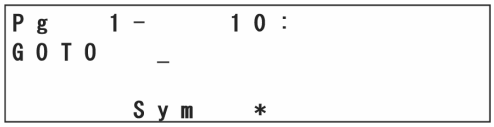
Press the return key to move the cursor to the location of commands.



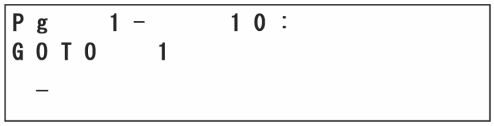
Display “GOTO” with 9 of the 10 key, SF key or . key.



Select the F2 (GOTO) key and press the return key.

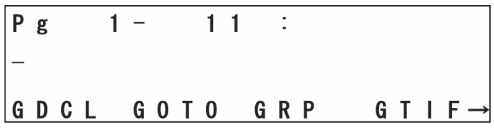


Enter the same numerical value as the one input for "TAG" operation 1 for operation 1. Enter 1 here and press the return key.



Press the WRT key to transfer the program data to the controller.

* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



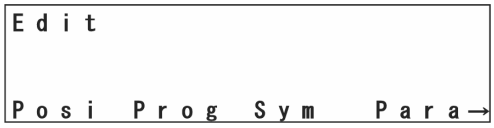
Press the ESC key several times to move to the Flash ROM writing screen.

To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

The message "Please wait…" flashes during Flash ROM writing.

* Never turn off the power to the controller at this time.

Flash ROM writing is completed.



Return to the edit mode screen by pressing the ESC key.

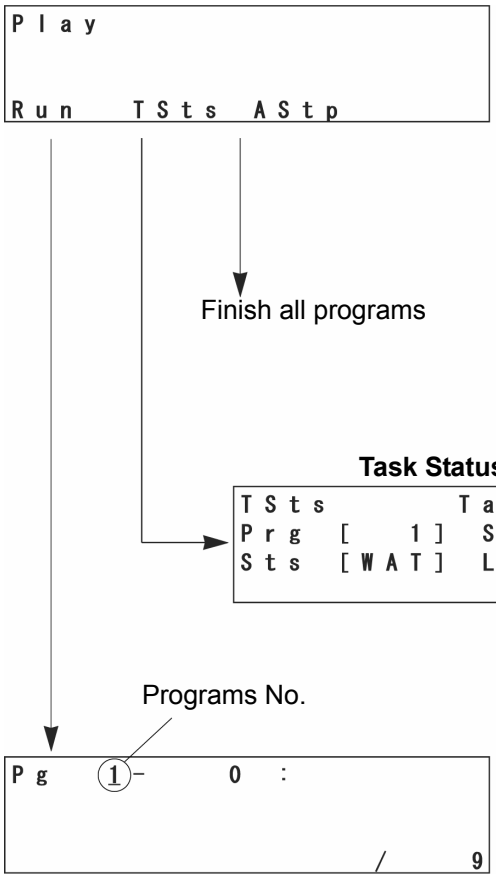
10. Program Execution (Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

Execute the program made in “9-1. Orthogonal Axis” in the previous chapter.
You can execute the program made in “9-2. SCARA Axis” simultaneously.

10-1. Operation Confirmation

Play Mode Screen

Press the F2 (Play) key from the mode selection screen and move to the play mode screen.



There are 3 kinds of items at the play mode screen:

F1 (Run): Move to the program No. input screen to execute.

F2 (TSts): Move to the task status screen which is already executing.

F3 (AStop): Finish all programs which are executing.

(F2 and F3 keys are function keys which are used after executing programs.)

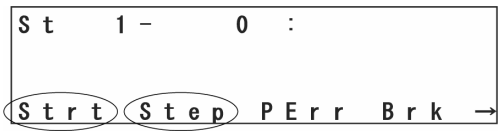
Prg ··· Program No. which is executing
Step ··· Step No. which is executing
Sts ··· Task status
Lvl ··· Task level

The cursor is located at the program No.
Input the program No. you would like to execute with the PAGE UP･PAGE DOWN keys and press the return key.

Move to the operation mode selection screen.

Select step by step execution or the continuance operation.

Operation Mode Selection

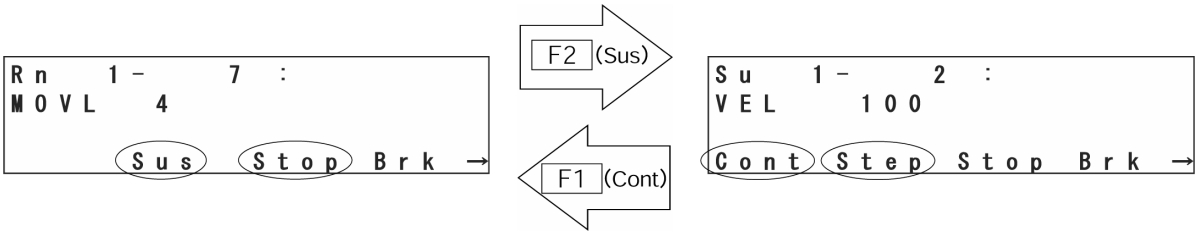


Start the continuance operation by pressing the F1 (Strt) key.

Start the operation by pressing the F2 (Step) key.

Continuance Operation Mode

Step Operation Mode

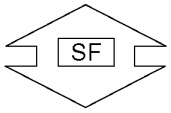


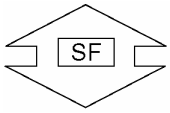
Display the current executing program step. (except continuance movement commands)

Switch to the step operation by pressing the F2 (Sus) key.
Select the finish operation by pressing the F3 (Stop) key.

After displaying the current executing program step, display the next step.

Execute programs step by step, each time you press the F2 (Step) key.
Switch to continuance operation by pressing the F1 (Cont) key.
Select the finish operation by pressing the F3 (Stop) key.





The monitor under operation

F1 (Posi): Display Current Position
F2 (LFlg): Local Flag
F3 (LVar): Local Variable

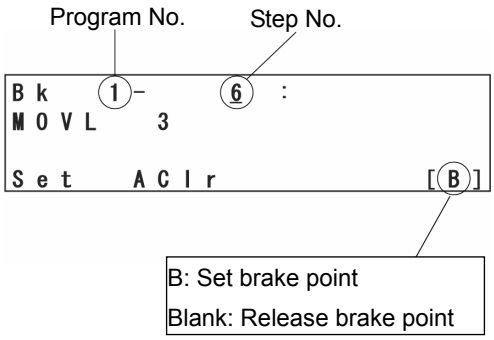
The monitor under operation

F1 (Posi): Display Current Position
F2 (LFlg): Local Flag
F3 (LVar): Local Variable

Note: When the teaching pendant is connected, it is in the “Safety Velocity Specified” state. Therefore, the setting of program and parameter doesn’t effect to maximum velocity and it is always under 250mm/sec. In the case of the SCARA axis, the maximum velocity is 250 mm/sec or lower for CP motion and 3% or less for PTP motion.
For the switching safety velocity mode, please refer to “16-8. Safety Velocity.”

10-2. Setting of Brake Point

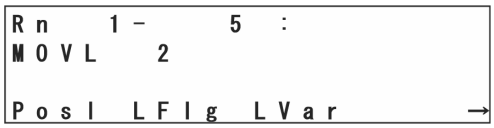
Brake point can be set with the continuance operation. Press the F4 (Brk) key in the operation mode selection screen or the operation mode screen.



Select the step No. to set brake point by pressing the PAGE UP · PAGE DOWN keys.
Execute setting and releasing the brake point each time you press the F1 (Set) key.
When you release all the set brake points, press F2 (Aclr) key.
When executing the continuance operation with the brake point, the program will be paused before executing commands for the step No. you set.
After pausing, press the F1 (Cont) key to continue executing rest of the program. Or execute the step operation by pressing F2 (Step) key.
When executing controller power ON/OFF or software reset, all the break points will be cleared.

10-3. Monitor under Operation

The current position of the actuators and data in the local area can be monitored during continuous operation or step operation.
Press the SF (shift) key at the continuance operation mode screen or the step operation mode screen.



Monitor items will be displayed in the function key area.

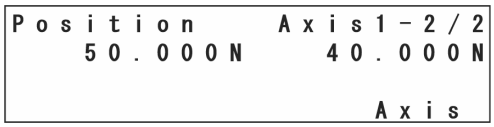
F1 (Posi): Display Current Position
F2 (LFlg): Local Flag
F3 (LVar): Local Variable

(1) Display the Current Position

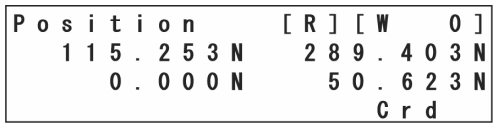
Display the current position of the actuators.
Select the F1 (Posi) key at the operation mode screen.

Mode Transition: PLAY – Run – Strt – Posi
Step – Posi

N/F, which is the end of position data indicates servo ON/OFF status.
N: servo ON, F: servo OFF



Orthogonal Axis

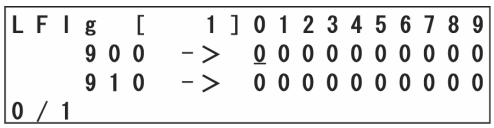


SCARA Axis

(2) Local Flag

This is the local flag On/OFF display. It can be switched ON/OFF.
Press the F2 (LFlg) key on the operation mode screen.

Mode Transition: PLAY – Run – Strt – LFlg
Step – LFlg



The local flag where the cursor is located can be switched ON/OFF each time by pressing the F1 (0/1) key.
The cursor location can be moved with the return key and ◀ ▲ ▼ ▶ key.
The screen displays 20 Flag Nos. at a time by pressing the PAGE UP · PAGE DOWN keys.

(3) Local Variable

Displays the contents of the local variables and the local strings. Moreover, values can be substituted for a local variable and the character sequence can be substituted for a local string. Select the F3 (LVar) key on the operation mode screen.

```
Play-LVar


Itg    Real  Str
```

3 kinds of local variables are displayed:

F1 (Itg): Integer
F2 (Real): Real Number
F3 (Str): String

① Local Integer variable

Mode Transition: PLAY—Run—Strt—LVar—Itg / Step—LVar—Itg

```
LVar-Itg    [×××]
        1  ->                0
        2  ->                0
```

② Local Real Variable

Mode Transition: PLAY—Run—Strt—LVar—Real / Cont—LVar—Real

```
LVar-Real  [    1]
  100>           0.0000000
  101>           0.0000000
```

The cursor is located in the data area (contents of variable). You can substitute values by inputting value by pressing one of 10 keys and pressing the return key. Move the cursor location with the return key and ◀ ▲ ▼ ▶ key.
The variable No. can be changed with the PAGE UP · PAGE DOWN keys.

③ Local String

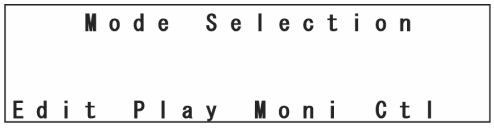
Mode Transition: PLAY—Run—Strt—LVar—Str / Step—LVar—Str

```
LStr  [    1] 0 1 2 3 4 5 6 7 8 9
        0  ->  _
       10  ->
Num
```

The cursor is located in the data area (column). Input the ASCII code by pressing one of 10 keys and press return key to substitute letters. (Convert hexadecimal A~F to alphabet with the F1 (Alph/Num) key and then input substitution.)
Move the cursor location with the return key and ◀ ▲ ▼ ▶ key.
The PAGE UP · PAGE DOWN keys scrolls the cursor every 20 columns each time they are pressed .

11. Execute or stop the positioner mode of the SSEL, ASEL and PSEL controller.

When the SSEL, ASEL or PSEL controller is in the positioner mode, execute or stop the positioner mode.



Press the F2 (Play) key from the mode selection screen and move to the play mode screen.

There are 3 kinds of items at the play mode screen:

F1 (Run): Execute the positioner mode which is currently specified.

F3 (Stop): Stop the positioner mode.

Note: When the SSEL, ASEL or PSEL controller is executing in the positioner mode, parameter changes or Flash ROM writing cannot be performed.
After stopping the positioner mode by the above operation, perform parameter changes or Flash ROM writing.

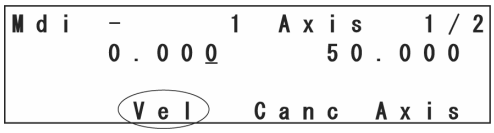
12. Position Edit

12-1. Mdi (Manual Direct Input)

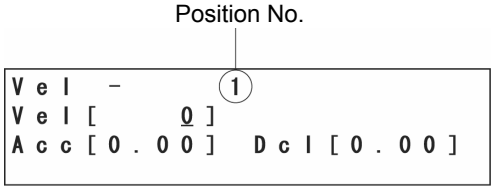
The input value of the position data can be entered with the 10 key.
For inputting input data for a coordinate position by using the 10 key, please refer to “9. Simple Operation Procedures.”

How to input Vel (Velocity), Acc (Acceleration), and Dcl (Deceleration) on each position No.

Mdi (Manual Direct Input)
Transit to the Manual Direct Input screen: Edit → Posi → Mdi → Position No. Return

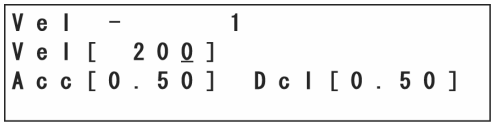


Vel is displayed at the function key area of the data input screen for each axis. Press the F2 (Vel) key.



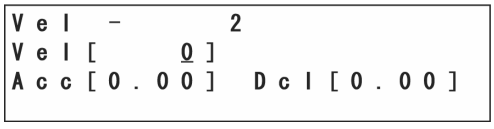
Vel · ACC · Dcl Input Screen

Move the cursor with the return key and input the value to the required place by using the 10 keys. Then press the return key.



After input, transmit the data to the controller with the WRT key.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



The position No. will be incremented and the next input screen, Vel · Acc · Dcl, will be displayed.

12-2. Teaching of the orthogonal axis: 5-axis, 6-axis, TT, SSEL, ASEL and PSL controller of X-SEL-K, P/Q and PX/QX

12-2-1. Teac (Teaching)

Teaching is one way to input position data moving the actuator to an arbitrary position and getting that actuator's current position as data.
Methods for moving the actuators to an arbitrary position are the jog, inching, and manual operation with a servo OFF status.

The fundamental flow of teaching is as follows:

① Move the actuator. (Jog operation · inching operation · manual movement with a servo OFF status)
Select position No. and axis No. for data input.

↓

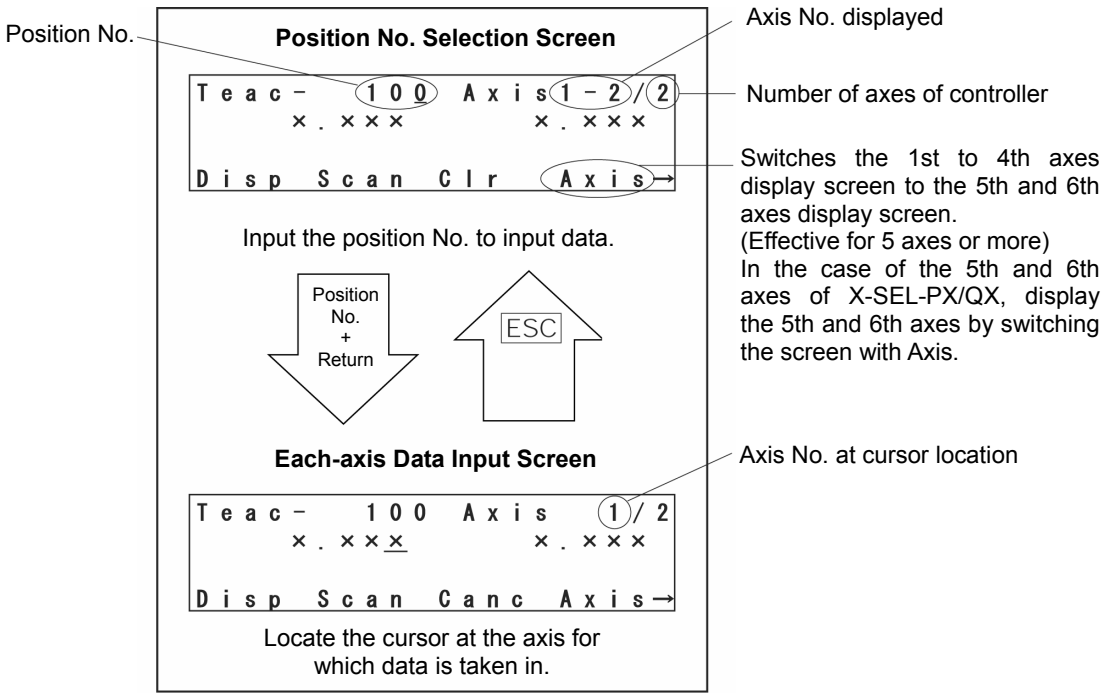
② Take the data of the current position of the actuator into the teaching screen.

↓

③ Transmit the data to the controller.

Input the position data by teaching and repeating ①~③.

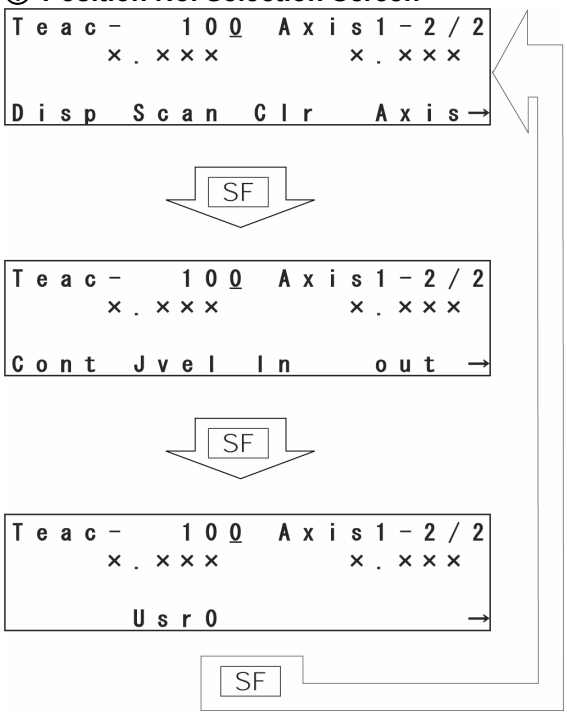
Teaching is transacted mainly at the teaching screen.
Transition to the teaching screen: Edit–Posi–Teac
X-SEL-PX/QX is Edit-Posi-TchL



(1) Teaching Screen

There is the position No. selection screen and each-axis data input screen for the teaching screen. Execute teaching of all axes simultaneously (take in current position · clear) on the position No. selection screen. Execute teaching of each axis at each-axis data input screen.)

① Position No. Selection Screen



Description of the function key

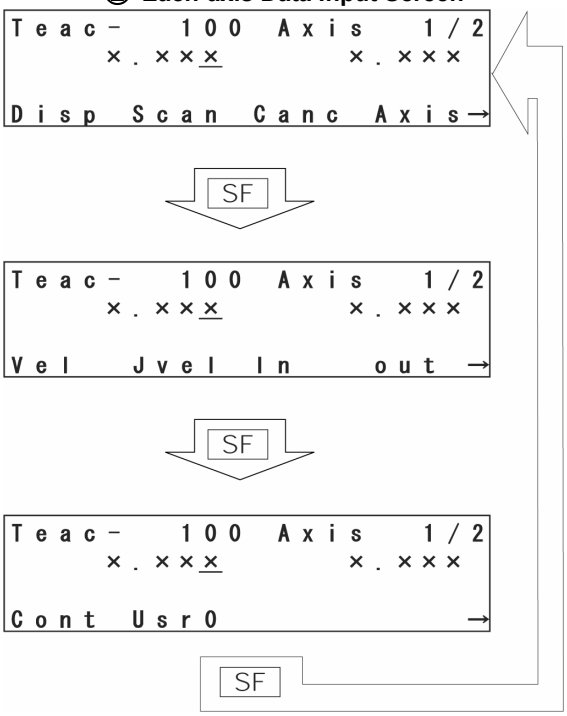
F1(Disp):	Switch the input data screen to the current position display.
F2(Scan):	Take the current positions of all axes into the input screen.
F3(Clr):	Clear the all-axis data of the selected position No. by pressing the F1 key after pressing this key once. Clear the controller's data without pressing the WRT key.
F4(Axis):	Switch the 1st to 4th axes display screen to the 5th and 6th axes display screen. (Effective for 5 axes or more)

F1(Cont):	Execute continuance operation.
F2(JVel):	Set the jog velocity, etc.
F3(In):	Monitor the input port.
F4(Out):	Monitor the output port.

F2(UsrO):	Turn ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to preset the I/O parameters No. 74 and No. 75.)

Input the position No. with the 10 keys, and press the return key to move to the each-axis data input screen.

② Each-axis Data Input Screen



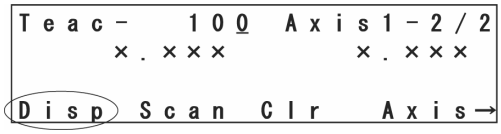
Description of the function key

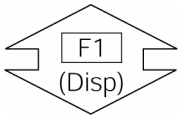
F1(Disp):	Switch the input data screen to the current position display.
F2(Scan):	Take the current position of the axis at which the cursor is located into the input screen.
F3(Canc):	Clear the input data.
F4(Axis):	Switch the 1st to 4th axes display screen to the 5th and 6th axes display screen. (Effective for 5 axes or more)

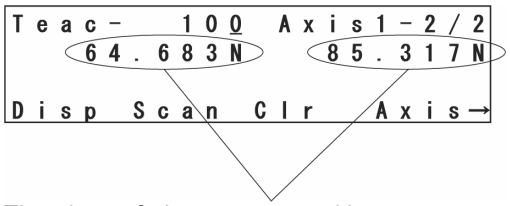
F1(Vel):	Input the data of velocity, etc., to each position No.
F2(JVel):	Set the jog velocity, etc.
F3(In):	Monitor the input port.
F4(Out):	Monitor the output port.

F1(Cont):	Move to the continuance transition mode.
F2(UsrO):	Turn ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to preset the I/O parameters No. 74 and No. 75.)

For incremental specification, it is required to execute homing after supplying power or software reset before you start teaching.

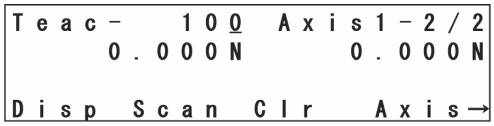






The data of the current position screen before homing doesn't have meaning.

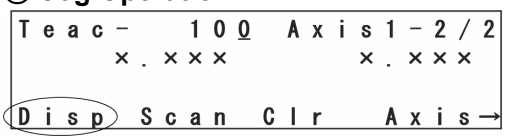
Turn the servo ON condition by pressing the SERVO key and then the ALL+ key in the teaching screen condition..
To confirm servo ON/OFF status, press the F1 (Disp) key.
All axes start homing by pressing the HOME key and the ALL+ or ALL- key.

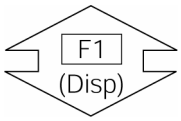


After homing is complete, execute teaching.

(2) Movement of an actuator

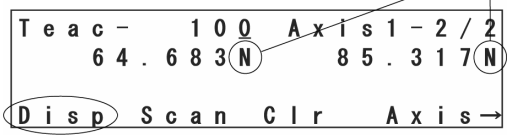
① Jog Operation





N: Servo ON
F: Servo OFF

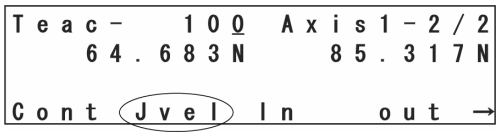
Current Position Display



(The above diagram is 2 axes specification; valid jog keys are 1+, 2+, 1-, and 2-.)

Turn the servo ON by pressing the SERVO key and then the ALL+ key in the teaching screen condition. Execute the all-axis servo OFF command when there is any axis in the servo ON status, and execute the all-axis servo OFF command when all axes are in the servo OFF status.
To confirm the servo ON/OFF status, press the F1 (Disp) key to display the current position.

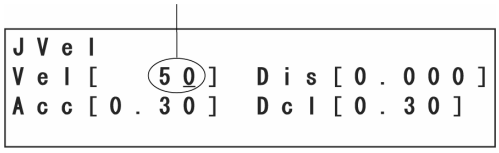
Press the 1-, 1+, 2-, 2+, 3-, 3+, 4- and 4+ keys to move the actuator to a designated position. (1～4 indicate axis No. and + represents plus direction [forward] while – represents minus direction [backward].)
To execute jog operation for the 5th and 6th axes, press the F4 (Axis) key to switch the display to the 5th and 6th axes data display screen.
(1+: Plus direction for the 5th axis, 1-: Minus direction for the 5th axis, 2+: Plus direction for the 6th axis, 2-: Minus direction for the 6th axis.)



Changing the Jog Velocity

Change the actuator's moving velocity at the time of the jog operation.
Display "JVel" (jog velocity) on the Teaching screen and press the function key that it corresponds to. (Depending on the screen condition, you need to press SF (shift) key to display "JVel.")

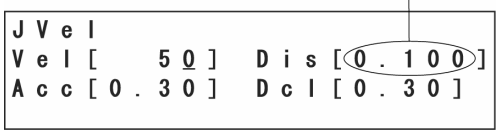
Jog velocity 50mm/sec

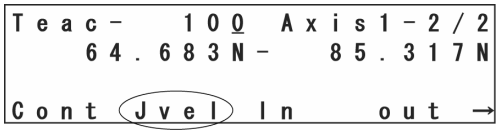


Input Vel (velocity), Acc (acceleration), and Dcl (deceleration) at the time of the jog operation with the 10 keys and press the return key. Set Dis (inching distance) 0.000.
You can also set the inching distance from this screen.
Return to the teaching screen with the ESC key and execute the jog operation.

② Inching Operation

Inching distance 0.1mm





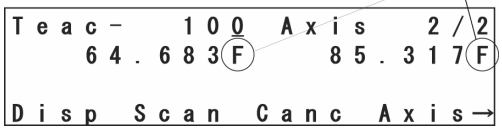
(The above diagram is 2 axes specification; valid jog keys are 1+, 2+, 1-, and 2-.)

Set the inching distance. (the moving distance each time pressing jog key.) Input the value on Dis (inching distance) at the jog velocity change screen and press the return key.
Value input range is 0.001~1.000 (unit: mm).
Return to the teaching screen with the ESC key and execute the inching operation.

Clicking jog key once moves one inching distance.
Clicking any of 1+ through 4+ makes inching movement in the coordinate plus direction, while clicking any of 1- through 4- makes inching movement in the coordinate minus direction.
Pressing and holding the jog key changes to jog operation. In approximately 1.6 seconds after the jog key is pressed, inching operation changes to jog operation and further continuing to press the key changes the jog velocity per second as follows:
1→10→50→100 mm/sec.

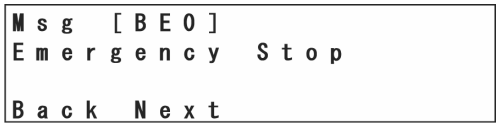
③ Manual Movement with Servo OFF Status

F: Servo OFF



Turn the servo OFF condition by pressing the SERVO key and the ALL- key in the teaching screen condition.
To confirm the servo ON/OFF status, press the F1 (Disp) key.
Move the actuators to the designated position via manual mode.

Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.

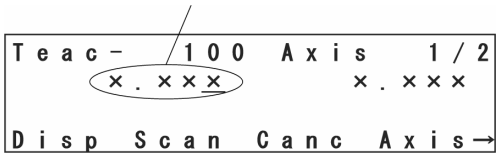


Return to the teaching screen with the ESC key on the emergency stop input screen.

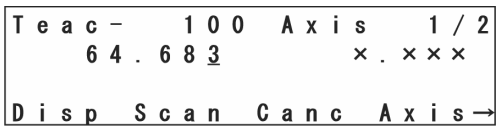
> ⚠ DANGER
> Be sure to execute manual movement when the EMERGENCY STOP button is pressed.

(3) Take in the current position as a data

Take the selected actuator's location as position data into the teaching screen.



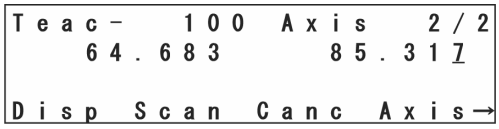
Input the position No. into which data is taken with 10 keys on the position No. select screen and press the return key.
Or select position No. into which data is taken with the PAGE UP · PAGE DOWN keys on the data input screen.

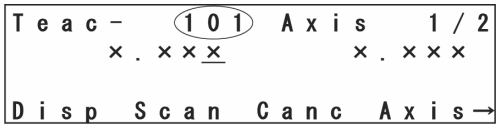


Take in the current position data of all axes by pressing the F2 (Scan) key on the position No. selection screen.
Take in the current position data of the axis where the cursor is located by pressing the F2 (Scan) key on the each-axis data input screen. (The data is executed per axis. The diagram on the left is for taking in data on the each-axis data input screen.

(4) Transmit to the Controller

Transmit the taken-in data to the controller.





Press the WRT key in the teaching screen condition.
Save the taken-in data to the controller memory.
Position No. will be increased 1 by pressing the WRT key.
You can only transmit 1 screen of data to the controller. You can't transmit plural position No. data at one time.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

(5) I/O Monitor · Location Confirmation

During teaching operation, you can monitor the input and output ports. You can also confirm the location by moving an actuator to a to the location of the position data with teaching.

① Input / Output Monitor

Select In or Out from the function keys in the teaching screen condition.
In: Input port Out: Output port

Input Port

```
Moni-In      0 1 2 3 4 5 6 7 8 9
         0  ->  0 0 0 0 0 0 0 0 0 0
        10  ->  0 0 0 0 0 0 0 0 0 0
```

Output Port

```
Moni-Out     0 1 2 3 4 5 6 7 8 9
       300  ->  0 0 0 0 0 0 0 0 0 0
       310  ->  0 0 0 0 0 0 0 0 0 0
0 / 1
```

You can switch the status of the output port OFF/ON (0/1) where the cursor is located by pressing the F1 (0/1) key.
(OFF/ON (0/1) status is switched each time you press F1 key.)

② Moving

Move the actuator to the location of the position data transmitted to the controller.

Position No. to move

```
Teac-        1  Axis1-2/2
     0.000          50.000

Disp  Scan  Clr    Axis→
```

SF

```
Teac-        1  Axis1-2/2
     0.000          50.000

Cont  Jvel  In      out  →
```

Moving velocity 50mm/sec

```
JVel
Vel[    50]  Dis[0.000]
Acc[0.30]  Dcl[0.30]
```

Select position No. to move in the teaching screen condition.
Turn the servo ON by pressing the SERVO key and then the ALL+ key.
To confirm the servo ON/OFF status, press the F1 (Disp) key.
The actuator starts moving by pressing the MOVE key and then the ALL+ or ALL- key, in the case of all-axis movement. Press the 1-, 1+, 2-, 2+, 3-, 3+, 4- and 4+ keys in the case of each axis movement.
To stop movement halfway, press the STOP key.

When you confirm or change the moving velocity, press F2 (JVel) key to move to the velocity changing screen.

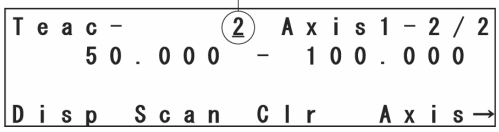
Input alteration data with 10 keys and press return key. After changing, return to the previous screen with ESC key.

If velocity, acceleration and deceleration are set in the position data, priority will be given to it.
Priority: Parameters < JVel < Position data

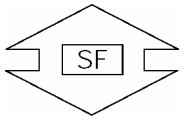
③ Continuous movement

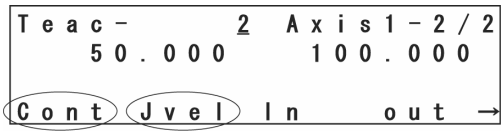
Move the actuator continuously to the location of the position data transmitted to the controller.

Position No. you'd like to move first



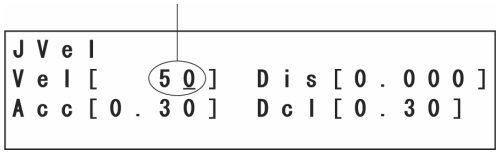
Select the position No. to move first in the teaching screen condition and press return key.
Turn the servo ON by pressing the SERVO key and then the ALL+ key.
To confirm the servo ON/OFF status, press the F1 (Disp) key.



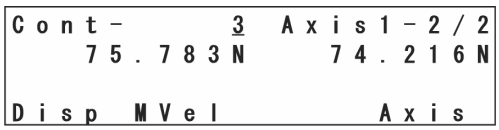


Press the F1 (Cont) key.
When you change the moving velocity, press the F2 (JVel) key to move to the velocity change screen.

Moving velocity 50mm/sec



Input changed data with the 10 keys and press the return key. After changing, return to the previous screen with the ESC key.
(The moving velocity is set 50mm/sec at the diagram on the left.)
If velocity, acceleration and deceleration are set in the position data, priority will be given to it.
Priority: Parameters < JVel < Position data

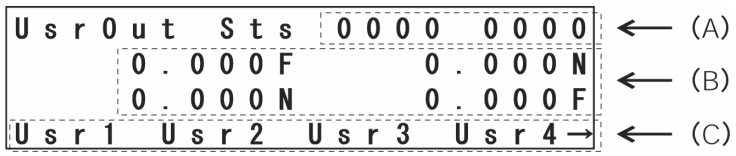


The actuator (in all axes) starts continuous movement by pressing the MOVE key and then the ALL+ or ALL- key, in the case of all-axis movement.
Press the 1-, 1+, 2-, 2+, 3-, 3+, 4- and 4+ keys in the case of each axis movement.
During continuous movement, the display changes to the current position display. To stop, press the STOP key.
To restart continuous movement, press the MOVE key.

Note: Please note that it may take a few seconds before movement start after the MOVE, ALL+, or ALL- key are pressed. (The time elapsed until movement start varies according to the number of registered position data.)

(6) User-specified output port operation

The output ports set for the parameter can be easily turned ON/OFF.
Select UsrO among the function keys in a teaching screen condition.



(A) User-specified output port status
The conditions of user-specified output ports are displayed as “1” (=ON) and “0” (=OFF).
(The conditions are displayed from the first specified port for the number of specified ports.)

(B) Current position and servo ON/OFF
The current position and servo ON/OFF condition (“N”=ON, “F”=OFF) are displayed for each axis.

(C) Function for operation of user-specified output ports
This is the function for ON/OFF operation of user-specified output ports.
This function is allocated to “Usr1,” “Usr2,” “Usr3”… in this order from the first user-specified output port for the number of specified ports.
(“Usr1” to “Usr4” and “Usr5” to “Usr8” are changed with the SF key.)
ON/OFF operation can be performed for each output port by pressing the function keys (F1 to F4) corresponding to “Usr1” to “Usr4” and “Usr5” to “Usr8.”
(When the port status display is “0” [OFF], the port ON command is given. When the port status display is “1” [ON], the port OFF command is given.)

① Setting of user-specified output port parameters

For the operation method for parameter setting, refer to “16. Parameter Edit.”
The first port No. and the number of ports are set with the following parameters:

- Number of ports
  I/O parameter No. 74 “Qnt Prt Usr Out” (Number of output ports used by TP user [hand, etc.])
- First port No.
  I/O parameter No. 75 “Top No. Use Out” (First output port No. by TP user [hand, etc.])

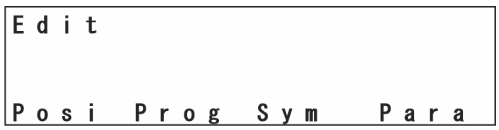
(Setting example) When the first port No. is set to 308 and the number of ports is set to 8:

“Usr1” (F1 key) ····· Output port 308
“Usr2” (F2 key) ····· Output port 309
“Usr3” (F3 key) ····· Output port 310
“Usr4” (F4 key) ····· Output port 311
“Usr5” (F1 key) ····· Output port 312
“Usr6” (F2 key) ····· Output port 313
“Usr7” (F3 key) ····· Output port 314
“Usr8” (F4 key) ····· Output port 315

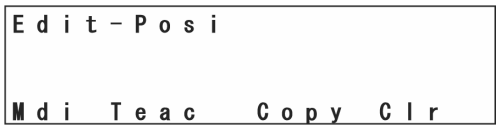
12-2-2. Example of Teaching Input

Entering the data into position No.10 using the jog and into position No.11 by manual operation with Servo OFF status.

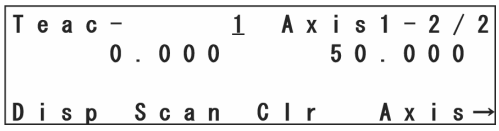
Select the F1 (Edit) key on the mode selection screen.



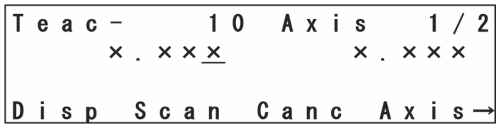
Select the F1 (Posi) key.



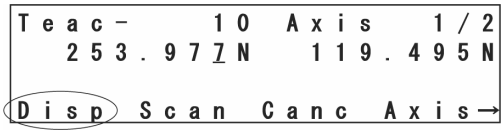
Select the F2 (Teac) key.



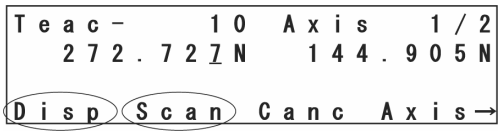
Input 10 to Position No. by using the PAGE UP · PAGE DOWN keys or the 10 keys and then the return key.



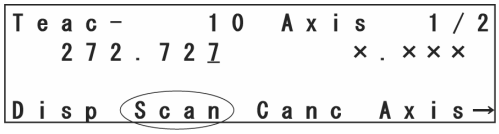
Turn the servo ON by pressing the SERVO key and then the ALL+ key.



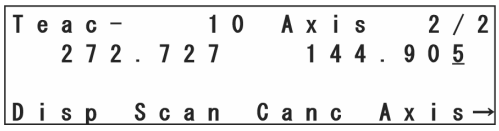
Move the actuator to the designated position by pressing the jog keys, 1-, 1+, 2-, and 2+.
Switch the display to the current position screen with the F1 (Disp) key.



Take in the current position data of the axis No. to the input screen where the cursor is located by pressing the F2 (Scan) key.
Switch the display to the data input screen with the F1 (Disp) key. Confirm that the data has been taken in.

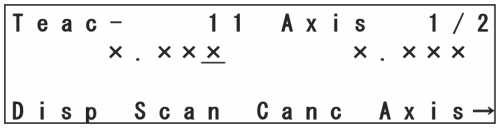


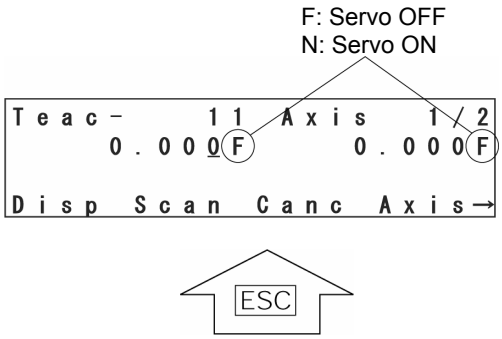
Press the return key to move the cursor to the next axis. Then press the F2 (Scan) key.



Transmit position data to the controller by pressing the WRT key.
The Position No. moves to 11.

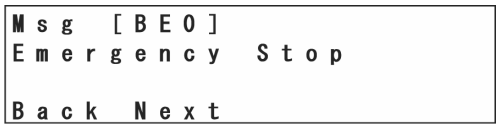
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.





Turn the servo OFF condition by pressing the SERVO key and ALL- key.
Press the F1 (Disp) key to confirm the servo OFF status.
Move each axes to the designate position via manual mode.

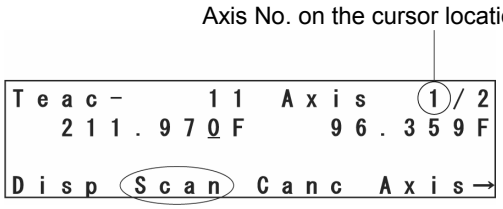
Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.



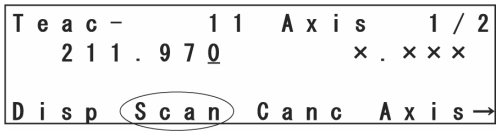
Return to the teaching screen with the ESC key on the emergency stop input screen.

> ⚠ DANGER
> Be sure to execute manual movement when the EMERGENCY STOP button is pressed.

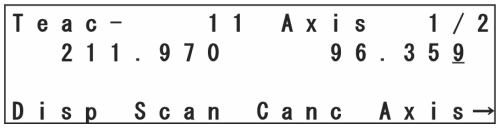
You have to release the brake for the Z axis to be moved by manual mode. When the brake is released for that reason, there is a possibility that the Z axis may fall by weight, such as a hand attached at the tip. Therefore, do not execute teaching to the Z axis via manual mode.



Take in the current position data of the axis No. to the input screen where the cursor is located by pressing the F2 (Scan) key.

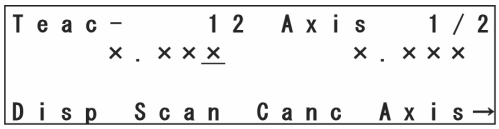


Press the return key and make the cursor move to the next axis. Then press the F2 (Scan) key.

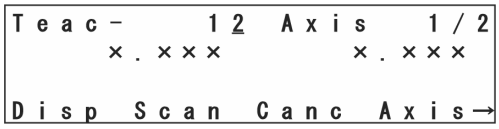


Transmit position data to the controller by pressing the WRT key.
The Position No. moves to 12.

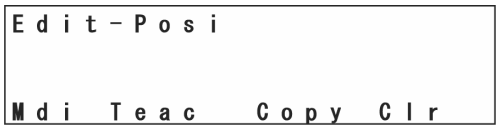
* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



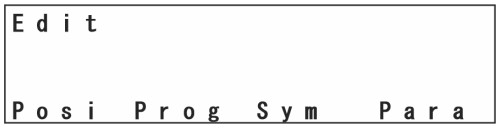
Finish the position data input by teaching.
Press the ESC key.



Press the ESC key.

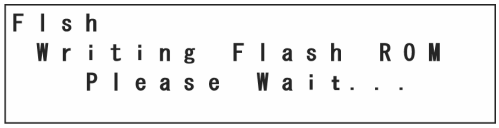


Press the ESC key.



Press the ESC key.

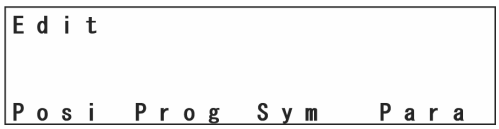
To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.



During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Return to the edit mode screen with the ESC key.



12-3. Teaching for SCARA axis: 1 axis – 4 axis of X-SEL-KX, PX/QX controller

12-3-1. Teac (teaching)

Teaching (method in which an actuator is moved to any given position and the current positions of the actuator are incorporated as data) is the method for inputting position data.
As the methods of moving the actuator to any given position, jog operation, inching operation, and manual operation in an emergency stop condition exist.

The basic flow of teaching is as follows:

① Move the actuator. (Jog operation, inching operation, or manual operation in a servo OFF condition) Select the position No. and axis No. for data input.

↓

② Incorporate the current positions of the actuator onto the teaching screen.

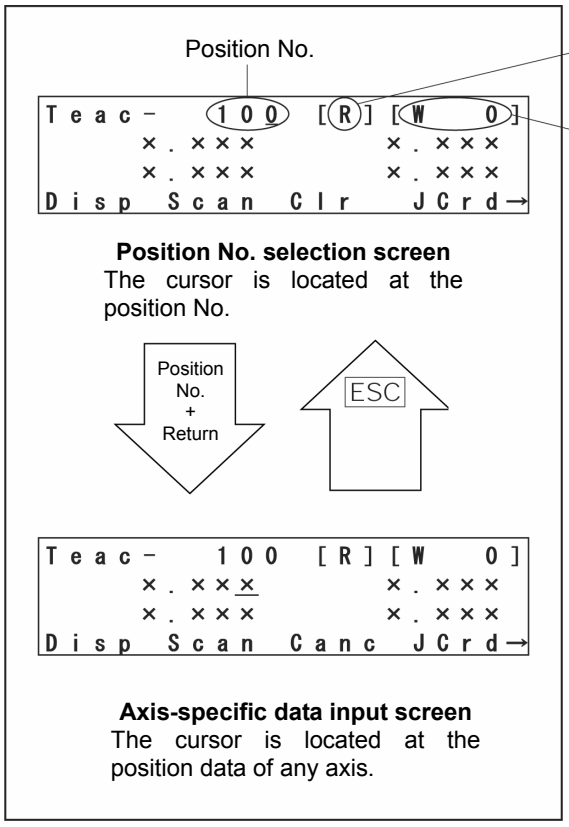
↓

③ Transfer the data to the controller.

Repeat the steps of ① through ③ above to input the position data by teaching.

Teaching is executed mainly on the teaching screen.
Mode flow to teaching screen: Edit – Posi – Teac

X-SEL-PX/QX is Edit-Posi-TchL



Indicates the current arm system.

R: Right arm, L: Left arm

Indicates the coordinate system for jog operation.

[W n]: Work coordinate system

n: Work coordinate system No.

([W 0]: Base coordinate system)

[T n]: Tool coordinate system

n: Tool coordinate system No.

[A]: Each axis system

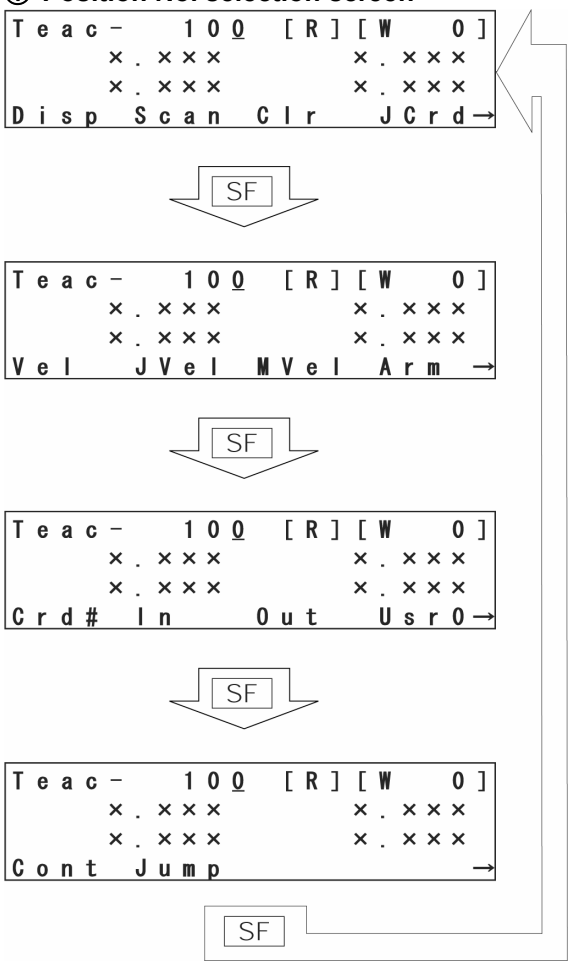
Caution

It is required to perform teaching with the same work coordinates system selection No., tool coordinate system selection No. and arm system as those for actual operation.
If any is different, positioning cannot be performed as intended.

(1) Teaching screen

The teaching screen consists of two screens including 'position No. selection screen' and 'axis-specific data input screen.' (Refer to the diagram on the previous page [p.116].)
On the position No. selection screen, teaching (current-position incorporation/clear) is given to all axes simultaneously. On the axis-specific data input screen, teaching is given on an axis basis.

① Position No. selection screen



Function key descriptions

F1(Disp):	It switches the display between the input data screen and the current position display.
F2(Scan):	It incorporates the current positions of all axes onto the screen.
F3(Clr):	It clears the all-axis data of the position No. selected.
F4(JCrd):	It changes the coordinate system for jog operation.

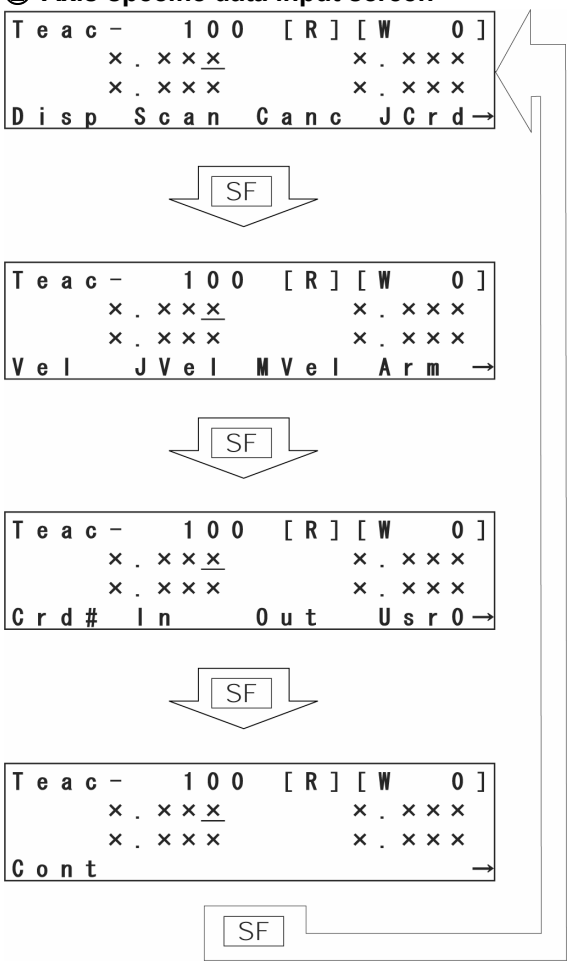
F1(Vel):	It inputs data of velocity, etc., for each position No.
F2(JVel):	It sets the jog velocity, etc.
F3(MVel):	It sets movement velocity in the continuous movement mode (Cont) or with the MOVE key.
F4(Arm):	It changes the arm system. (Servo ON status required in advance) Note: The arm operates.

F1(Crd#):	It selects the coordinate system No.
F2(In):	It monitors input ports.
F3(Out):	It monitors output ports.
F4(UsrO):	It turns ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to set the I/O parameters No. 74 and No. 75 in advance.)

F1(Cont):	It moves to the continuous movement mode.
F2(Jump):	It sets jump movement.

Enter the position No. with the 10 key, and press the return key to move to the axis-specific data input screen.

② Axis-specific data input screen



Function key descriptions

F1(Disp):	It switches the display between the input data screen and the current position display.
F2(Scan):	It incorporates the current positions of all axes onto the screen.
F3(Canc):	It clears the all-axis data of the position No. selected.
F4(JCrd):	It changes the coordinate system for jog operation.

F1(Vel):	It inputs data of velocity, etc., for each position No.
F2(JVel):	It sets the jog velocity, etc.
F3(MVel):	It sets movement velocity in the continuous movement mode (Cont) or with the MOVE key.
F4(Arm):	It changes the arm system. (Servo ON status required in advance) Note: The arm operates.

F1(Crd#):	It selects the coordinate system No.
F2(In):	It monitors input ports.
F3(Out):	It monitors output ports.
F4(UsrO):	It turns ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to set the I/O parameters No. 74 and No. 75 in advance.)

F1(Cont):	It moves to the continuous movement mode.

12-3-2. Jog movement direction and coordinate system

(1) Jog keys and movement directions

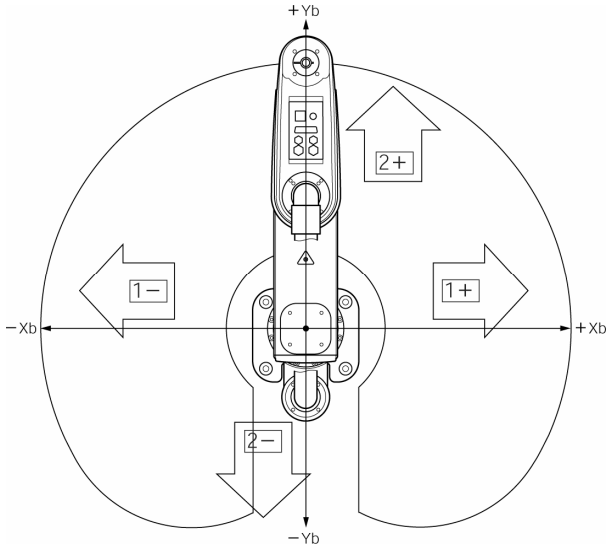
The movement direction during jog operation changes according to the coordinate system No. selected.

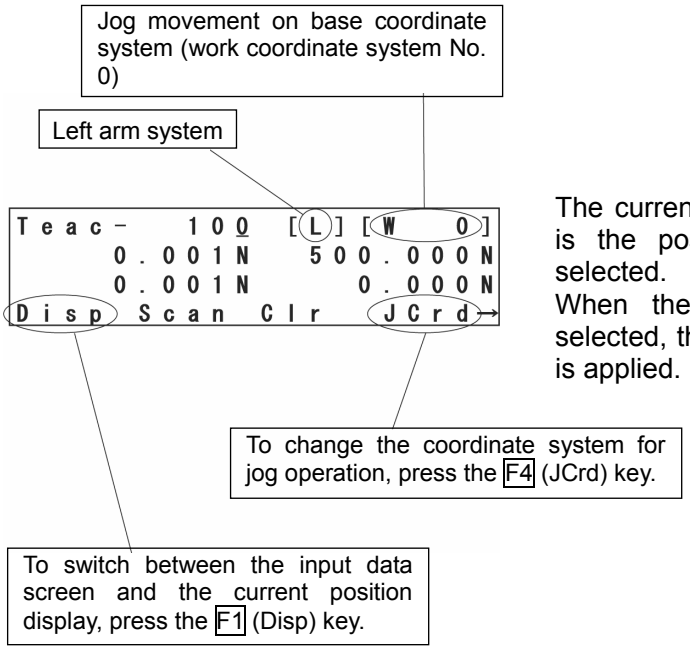
The status before shipment is the base coordinate system (work coordinate system No. 0) and tool coordinate system No. 0.

For the setting of coordinate system data, refer to “14. Coordinate System Data Editing.”

① Jog movement on base coordinate system

The jog keys and movement directions on the base coordinate system are as shown below.



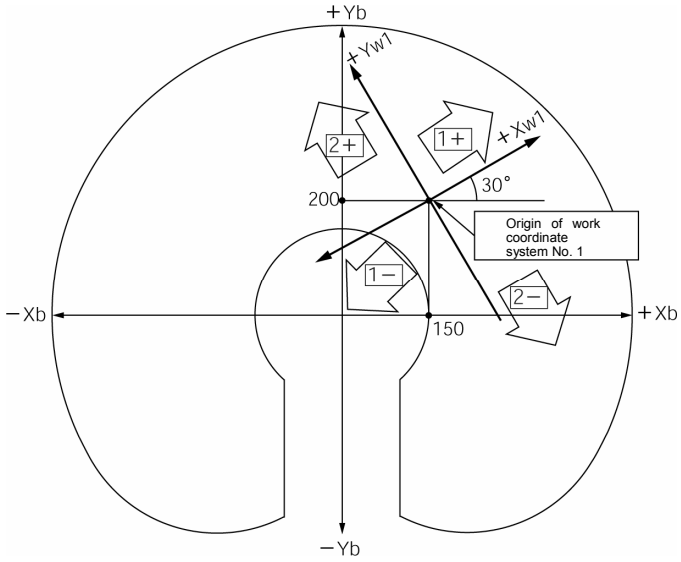


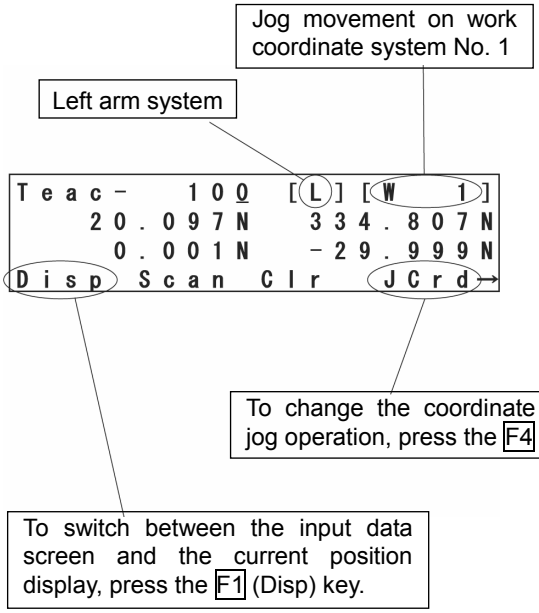
The current position display on the teaching screen is the position on the work coordinate system selected.

When the tool coordinate system No. is also selected, the coordinate value of the tool tip position is applied.

② Jog movement on work coordinate system

Example) The jog keys and movement directions on the work coordinate system No. 1 are as shown below. The offset values from the work coordinate system No. 1 become Xofw1 = 150, Yofw1 = 200, Zofw1 = 0, and Rofw1 = 30.

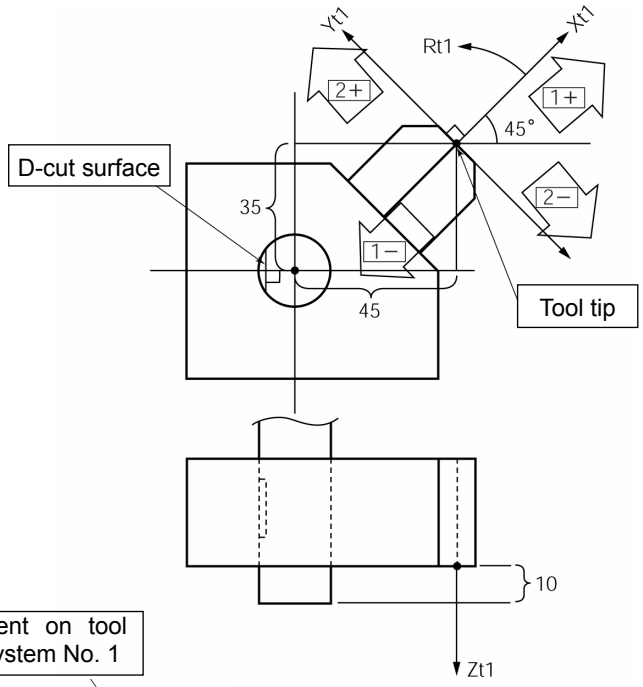


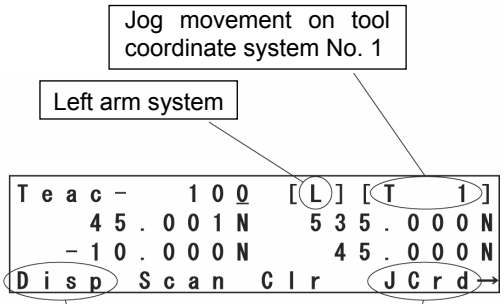


The current position display on the teaching screen is the position on the work coordinate system selected.
When the tool coordinate system No. is also selected, the coordinate value of the tool tip position is applied.

③ Jog movement on tool coordinate system

Example) The jog keys and movement directions on the tool coordinate system No. 1 are as shown below. The offset values from the tool coordinate system No. 1 become Xoft1 = 45, Yoft1 = 35, Zoft1 = -10, and Roft1 = 45.



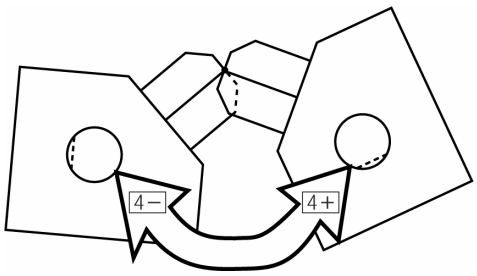


The current position display on the teaching screen is the coordinate position of the tool tip of the selected tool coordinate system No. on the work coordinate system selected.

To change the coordinate system for jog operation, press the F4 (JCrd) key.

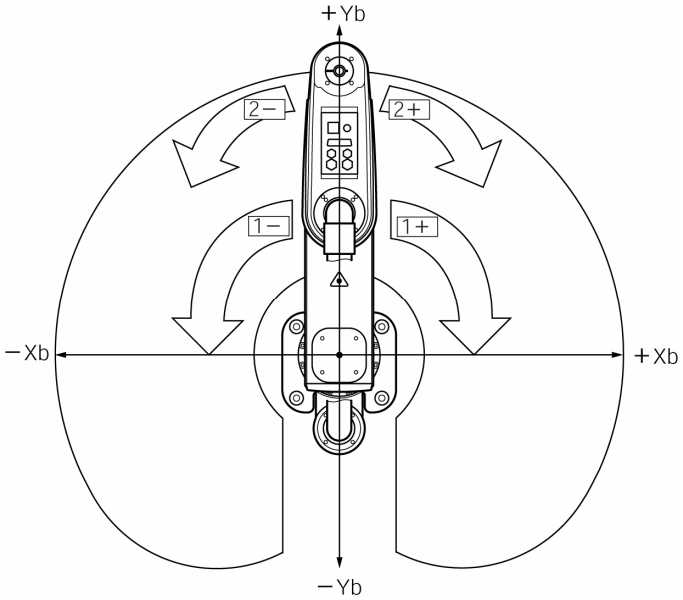
To switch between the input data screen and the current position display, press the F1 (Disp) key.

Pressing the jog key for the 4th axis (R axis) performs rotary movement centering on the tool tip as shown below.

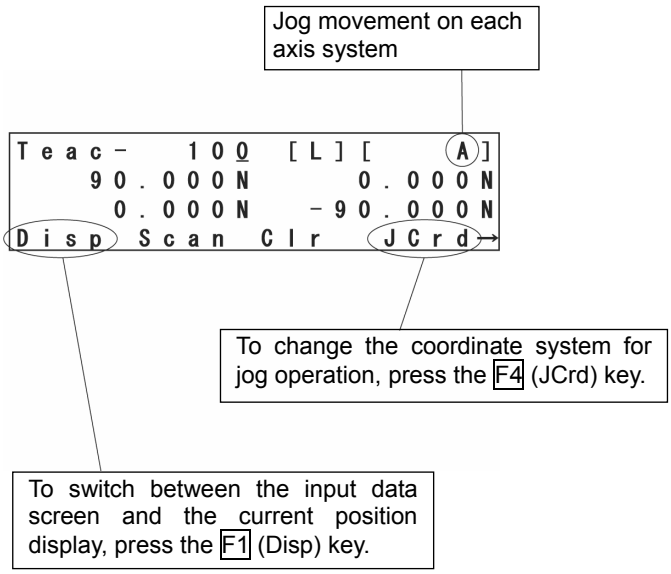


④ Jog movement on each axis system (jog movement on each arm)

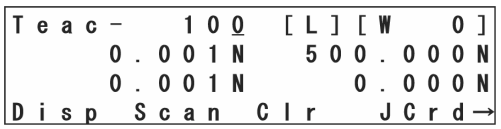
Each arm, jog keys and movement directions are as shown below.



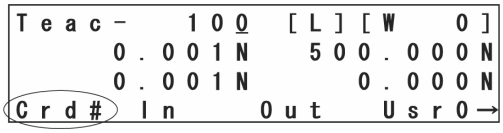
In the case of each axis system, the position display on the teaching screen cannot be incorporated.



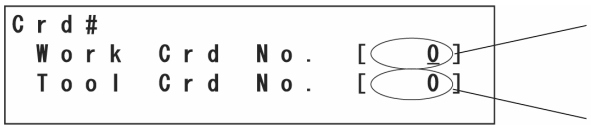
(2) Selection of coordinate system No.



Use the SF key to display Crd# on the teaching screen.

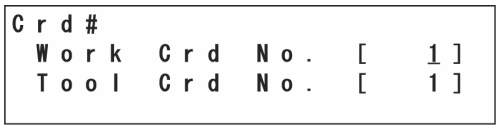


Press the F1 (Crd#) key.

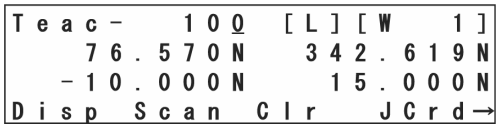


Enter the work coordinate system No.

Enter the tool coordinate system No.



This is a screen displayed when the work coordinate system No. 1 and the tool coordinate system No. 1 are selected.
Press the ESC key to return to the teaching screen.

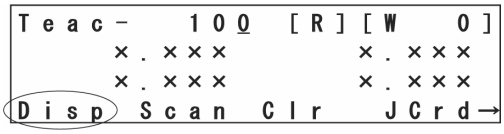


The coordinate values displayed indicate the tool tip position of the tool coordinate system No. 1 on the work coordinate system No. 1.

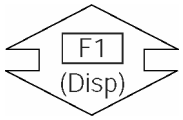
12-3-3. Actuator operation

Jog the actuator or move it to the input (transferred) position data by using the Teaching Pendant.
Operate the actuator on the teaching screen.
Mode flow to teaching screen: Edit — Posi — Teac
X-SEL-PX/QX is Edit-Posi-TchL

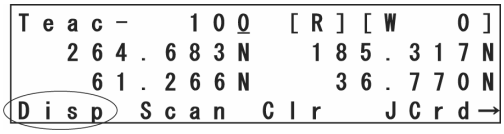
(1) Jog operation



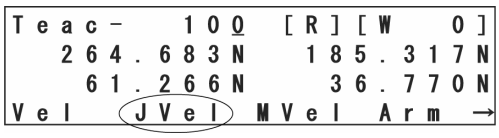
Turn the servo ON by pressing the SERVO key and then the ALL+ key in the teaching screen condition.
To check the servo ON/OFF status, press the F1 (Disp) key to display the current position.



Current position display



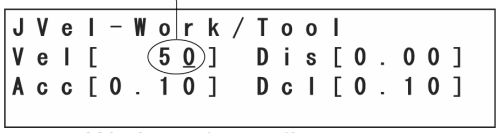
Before operation, check the jog operation coordinate system selected.
Press the 1- 1+ ～ 4- 4+ keys to move the actuator to any given position. (1～4 indicate axis No. and + represents plus direction [forward] while – represents minus direction [backward].)



Change of jog velocity

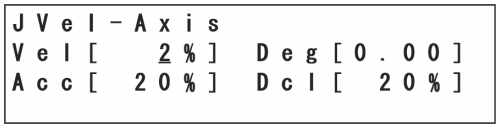
The actuator movement velocity under jog operation is changed.
Display “Jvel” (jog velocity) in the function key section on the teaching screen and press the corresponding function key.
(“Jvel” is not displayed without pressing the SF key depending on the screen condition.)

Jog velocity: 50 mm/sec



Work, tool coordinate system

Enter Vel (velocity), Acc (acceleration), and Dcl (deceleration) under jog operation with the 10 key and press the return key. Dis (inching distance) should be 0.000. In addition, the inching distance can also be set from this screen.
However, in the axis coordinate system, input percentage (%) values for Vel (velocity), Acc (acceleration) and Dcl (deceleration).



Axis coordinate system

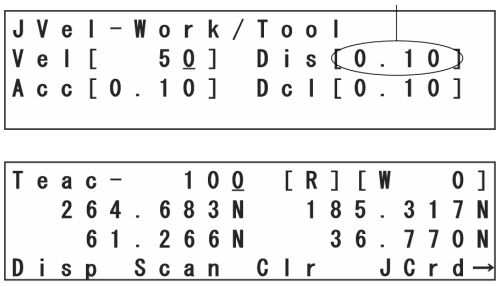
Return to the teaching screen with the ESC key and execute jog operation.

(2) Inching operation

Mode flow: [Edit] — [Posi] — [Teac] — [Jvel]

X-SEL-PX/QX is [Edit]-[Posi]-[TchS]-[JVel]

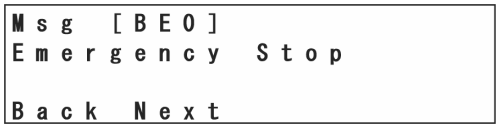
Inching distance: 0.1 mm



Set the inching distance (travel made every time the JOG key is pressed once).
Enter a numerical value for Dis (inching distance) with the 10 key and press the return key on the jog velocity change screen. The numerical input range is between 0.01 and 1.00 (unit: mm). Return to the teaching screen with the [ESC] key to execute inching operation.
Clicking the jog key once makes 1-inching distance movement.
Clicking any of [1+] through [4+] makes inching movement in the coordinate plus direction, while clicking any of [1-] through [4-] makes inching movement in the coordinate minus direction.

(3) Manual movement under emergency stop condition

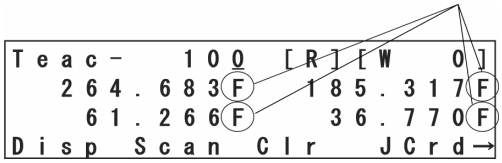
Turn the servo OFF by pressing the [EMERGENCY STOP button] key in the teaching screen condition.



Emergency stop input screen
Press the [ESC] key to return to the teaching screen.

⚠ Danger
Be sure to perform manual teaching while the EMERGENCY STOP button is being pressed.

Servo OFF



Move the actuator to any given position manually.

To move the Z-axis or R-axis manually, the brake must be released. Consequently, the Z-axis may drop under the weight of the hand attached to the tip when the brake is released. Do not perform teaching by manual movement of the Z-axis or R-axis.

(4) Arm system change

Change the current arm system over to the opposite arm system. (Right arm → left arm, left arm → right arm)

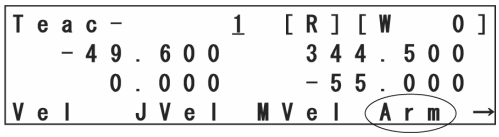
The 1st arm does not move and the 2nd arm moves in such a way that it becomes straightened with the 1st arm.

Change the arm system on the teaching screen.

Mode flow to teaching screen: Edit — Posi — Teac

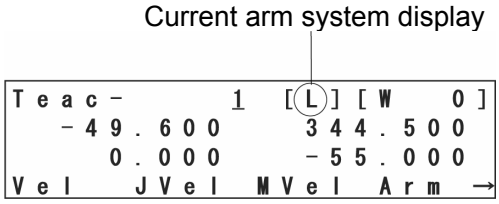
X-SEL-PX/QX is Edit-Posi-TchS

Press the SF key to display “Arm” in the function key section.



Turn the servo ON by pressing the SERVO key and then the ALL+ key.
Press the F4 (Arm) key.

Select whether or not to change the arm system.
To execute: Press the F1 (Yes) key. The 2nd arm starts to move.
Not to execute: Press the F2 (No) key. The screen returns to the previous screen.

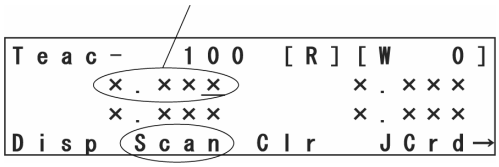


When the F1 (Yes) key is pressed, the display changes over to the screen under movement and the 2nd arm moves until it becomes straightened with the 1st arm.
After completion of changing over, the current arm system display will change.

(5) Incorporation of current positions as data

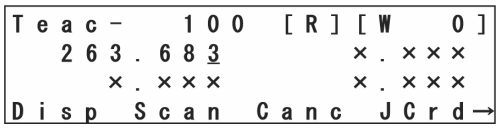
Check the work coordinate system No., tool coordinate system No., and arm system currently selected in advance. (Mode flow: Edit — Posi — Teac — Crd# , X-SEL-PX/QX is Edit–Posi–TchS–Crd#)

The selected actuator's location is incorporated as position data onto the teaching screen.



Each-axis data input screen

Enter the position No. into which data is incorporated with the 10 key on the position No. selection screen, and press the return key.
Or, select the position No. into which data is incorporated with the PAGE UP and PAGE DOWN keys on the data input screen.

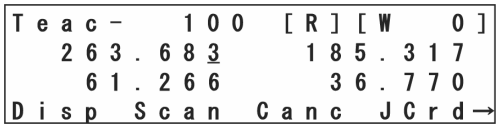


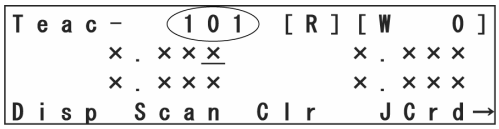
Each-axis data input screen

On the position No. selection screen, pressing the F2 (Scan) key incorporates the current position data for all axes.
On the axis-specific data input screen, pressing the F2 (Scan) key incorporates the current position data of the axis over which the cursor is located. (The data is incorporated on an axis basis. The left figure indicates the case of data incorporation on the axis-specific data input screen.)

(6) Transfer to controller

The incorporated data is transferred to the controller.





Press the WRT key in a teaching screen condition.
Store the incorporated data in the controller's memory.
Pressing the WRT key increments the position No. by 1.
What can be transferred to the controller is the data on one display screen. It is not possible to transfer the data of more than one position No. at a time.

* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.

(7) I/O monitoring

Input and output ports can be monitored during teaching operation.

① I/O monitoring

Select In or Out among the function keys in a teaching screen condition.

In: Input ports Out: Output ports

Mode flow: [Edit] — [Posi] — [Teac] — [In]
X-SEL-PX/QX is [Edit]-[Posi]-[TchS]-[In]

Input ports

```
Moni-In      0 1 2 3 4 5 6 7 8 9
         0  -> 0 0 0 0 0 0 0 0 0 0
        10  -> 0 0 0 0 0 0 0 0 0 0
```

Mode flow: [Edit] — [Posi] — [Teac] — [Out]
X-SEL-PX/QX is [Edit]-[Posi]-[TchS]-[Out]

Output ports

```
Moni-Out     0 1 2 3 4 5 6 7 8 9
        300  -> 1 1 1 0 0 0 0 0 0 0
        310  -> 0 0 0 0 0 0 0 0 0 0
0 / 1
```

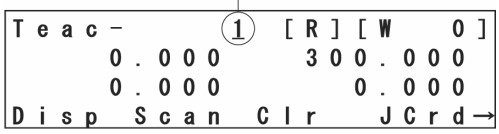
Pressing the [F1] (0/1) key can turn OFF/ON (0/1) the output port at the cursor location. Every time the [F1] key is pressed, the port is changed between OFF and ON (0 and 1).

(8) Movement

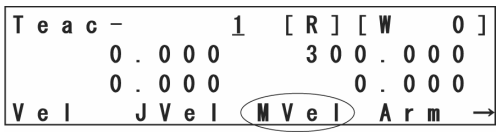
The actuator is moved to the location of the position data transferred to the controller.
(Check the location of the teaching position data.)
Mode flow to teaching screen: Edit — Posi — Teac

X-SEL-PX/QX is Edit-Posi-TchS

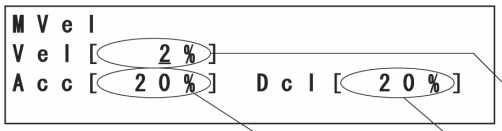
Position No. to move



Select the position No. you want to move in a teaching screen condition.
Press the SERVO key and then the ALL+ key to turn the servo ON.
To check the servo ON/OFF status, press the F1 (Disp) key.
When “N” is displayed for the position on the current position display screen, the servo is in the ON status.
The actuator starts moving by pressing the MOVE key and thenthe ALL+ or ALL- key. To stop movement halfway, press the STOP key.



When checking or changing the movement velocity, press the F3 (MVel) key to move to the screen for changing the velocity, etc.



Enter the change data with the 10 key and press the return key. After changing, return to the previous screen with the ESC key.

Ratio to maximum PTP velocity (axis-specific parameter No. 28)

Ratio to maximum PTP deceleration (axis-specific parameter No. 135)

Ratio to maximum PTP acceleration (axis-specific parameter No. 134)

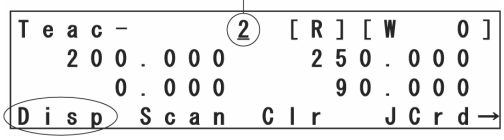
(9) Continuous movement

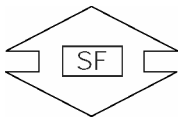
The actuator is continuously moved to the location of the position data transferred to the controller.

Mode flow to teaching screen: Edit — Posi — Teac

X-SEL-PX/QX is Edit-Posi-TchS

Position No. to move first

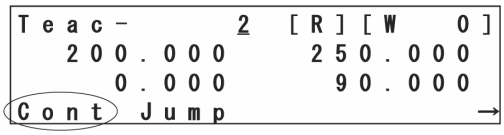




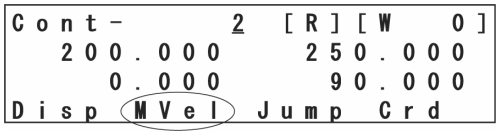
Press 3 times

Select the position No. to which you want to move the actuator first in a teaching screen condition, and press the return key.
Press the SERVO key and then the ALL+ key to turn the servo ON.
To check the servo ON/OFF status, press the F1 (Disp) key.

When “N” is displayed for the position on the current position display screen, the servo is in the ON status.

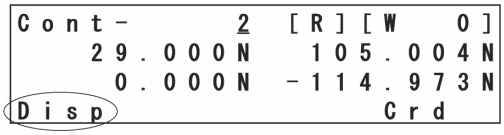


Press the SF key 3 times to display Cont.
Press the F1 (Cont) key.



When checking and changing the movement velocity, press the F2 (MVel) key to move to the screen for changing the velocity, etc.

After changing and checking, return to the previous screen by pressing the ESC key.

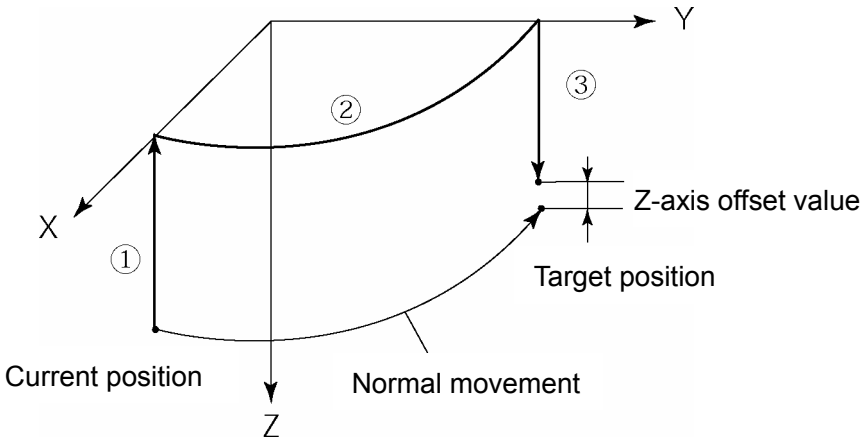


Pressing the MOVE key and then the ALL+ or ALL- key starts the actuator’s continuous movement.

Pressing the F1 (Disp) key displays the current target position data.

(10) Jump movement

The actuator is moved to the location of the position data transferred to the controller by jump motion (arch motion). Before/after normal movement or continuous movement, the Z-axis is moved up and down.



Motion sequence

① Raise the Z-axis from the current position to the top position (Z = 0). (Motion of the Z-axis only)

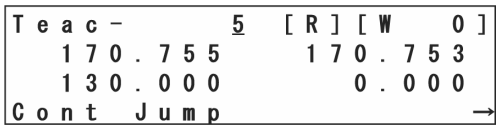
② Movement is performed to above the target position by PTP motion while the Z-axis stays at the top position. (Motion of the X-axis, Y-axis and R-axis only)

③ Lowering is performed to the target position. (Motion of the Z-axis only). When the Z-axis offset value is set, the Z-axis stops before (above) the target position by the same amount.

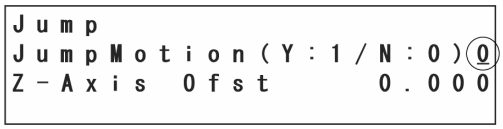
Z-axis offset value: Specify how many millimeters before the target position to stop the Z-axis. No minus value can be input.

(Example) When the Z-axis target position is 100.000 mm and the Z-axis offset value is 30.000 mm, the Z-axis stops at the position of 70.000 mm.

Setting of jump movement is performed on the teaching screen.
Mode flow to teaching screen: [Edit] — [Posi] — [Teac]
Press the [SF] key to display “Jump” in the function key section.



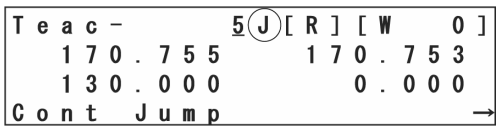
Press the [F2] (Jump) key.



Enter 1 to make jump motion effective or 0 to make it ineffective, and press the return key.

Enter the Z-axis offset value.
Enter the offset value (mm) from the Z-axis target position coordinate and press the return key.

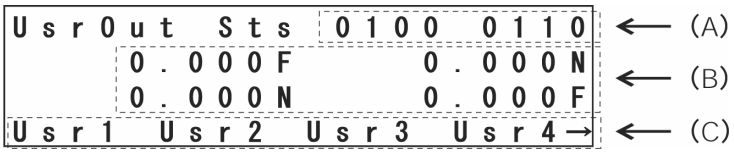
The set value is effective until the Teaching Pendant is reset or reconnected.



Return to the teaching screen by pressing the [ESC] key. When you press the [MOVE] key and then the [ALL+] or [ALL-] key after selecting the target position No., jump motion starts.
“J” is displayed at the right side of the position No. while jump motion is effective.

(11) User-specified output port operation

The output ports set for the parameter can be easily turned ON/OFF.
Select UsrO among the function keys in a teaching screen condition.
Mode flow: [Edit] — [Posi] — [Teac] — [UsrO]



(A) User-specified output port status
The conditions of user-specified output ports are displayed as “1” (=ON) and “0” (=OFF).
(The conditions are displayed from the first specified port for the number of the specified ports from the left.)

(B) Current position and servo ON/OFF display
The current position and servo ON/OFF condition (“N”=ON, “F”=OFF) are displayed for each axis.

(C) Function for operation of user-specified output ports
This is the function for ON/OFF operation of user-specified output ports.
This function is allocated to “Usr1,” “Usr2,” “Usr3”….in this order from the first user-specified port for the number of specified ports.
(“Usr1” to “Usr4” and “Usr5” to “Usr8” are changed with the SF key.)
ON/OFF operation can be performed for each output port by pressing the function keys (F1 to F4) corresponding to “Usr1” to “Usr4” and “Usr5” to “Usr8.”
(When the port status display is “0” [OFF], the port ON command is given. When the port status display is “1” [ON], the port OFF command is given.)

① Setting of user-specified output port parameters

For the operation method for parameter setting, refer to “16. Parameter Editing.”

The first port No. and the number of ports are set with the following parameters:

- Number of ports

  I/O parameter No. 74 “Qnt Prt Usr Out” (Number of output ports used by TP user [hand, etc.])

- First port No.

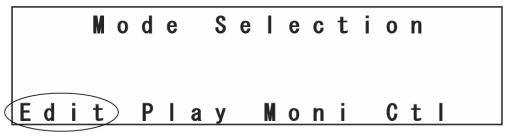
  I/O parameter No. 75 “Top No. Use Out” (First output port No. by TP user [hand etc.])

(Setting example) When the first port No. is set to 308 and the number of ports is set to 8:

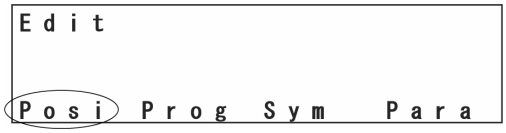
“Usr1” (F1 key)····· Output port 308
“Usr2” (F2 key)····· Output port 309
“Usr3” (F3 key)····· Output port 310
“Usr4” (F4 key)····· Output port 311
“Usr5” (F1 key)····· Output port 312
“Usr6” (F2 key)····· Output port 313
“Usr7” (F3 key)····· Output port 314
“Usr8” (F4 key)····· Output port 315

12-3-4. Teaching input example

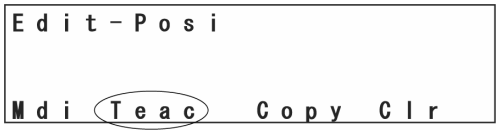
Data is input for the position No. 10 by jog operation and for the position No. 11 by manual operation under servo OFF.



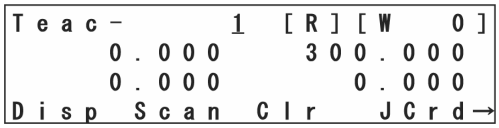
Select the F1 (Edit) key on the Mode Selection screen.



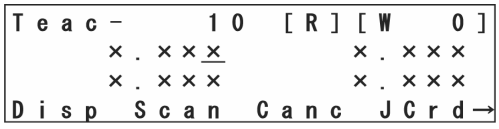
Select the F1 (Posi) key.



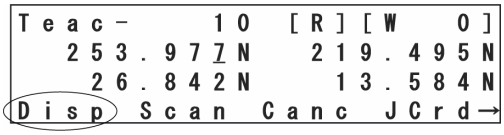
Select the F2 (Teac) key.



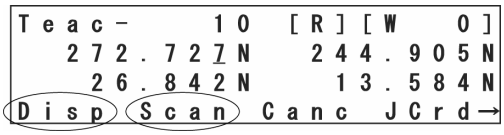
Enter 10 for the position No. with the PAGE UP and PAGE DOWN keys or the 10 key and confirm it with the return key.



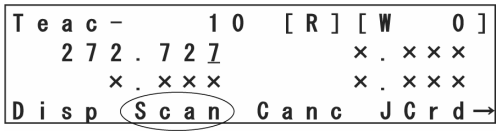
Press the SERVO key and then ALL+ key to turn the servo ON.



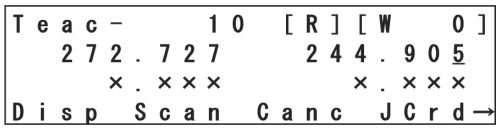
Press the jog key 1- 1+ ～ 4- 4+ to move the robot to any given position.



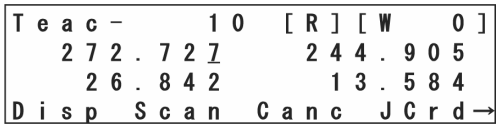
Pressing the F2 (Scan) key incorporates the current position of the axis No. over which the cursor is located onto the input screen.
Change the screen over to the data input screen with the F1 (Disp) key. Confirm that the data has been incorporated.
The current position data cannot be taken in (scanned) when the jog coordinate system is each axis system (“A” display).



Press the return key to move the cursor to the next axis, and press the F2 (Scan) key.

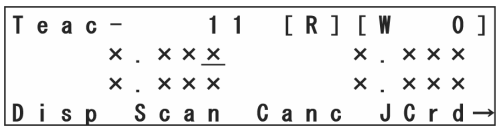


Incorporate the data of the Z-axis and R-axis in the same way.



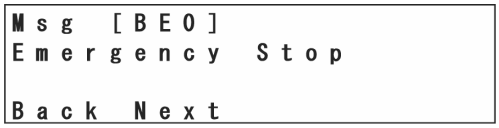
Press the WRT key to transfer the position data to the controller.
The position No. advances to 11.

* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



Press the SERVO key and then ALL+ key to turn the servo ON.

Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.

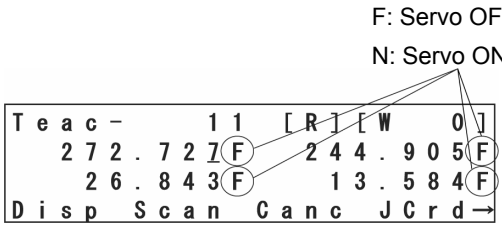


Press the ESC key to return from the Emergency Stop input screen to the teaching screen.

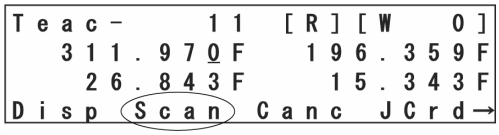
⚠ Danger

Be sure to perform manual teaching while the EMERGENCY STOP button is being pressed.

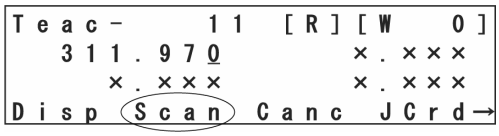
To move the Z-axis or R-axis manually, the brake must be released. Consequently, the Z-axis may drop under the weight of the hand attached to the tip when the brake is released. Do not perform teaching by manual movement of the Z-axis or R-axis.



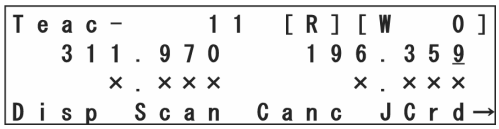
Confirm the servo OFF with the F1 (Disp) key.
Move each axis to any given position manually.



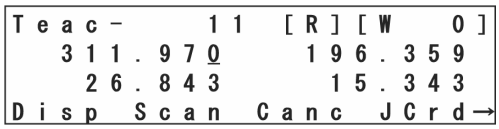
Pressing the F2 (Scan) key incorporates the current position of the axis No. over which the cursor is located onto the input screen.



Press the return key to move the cursor to the next axis, and press the F2 (Scan) key.

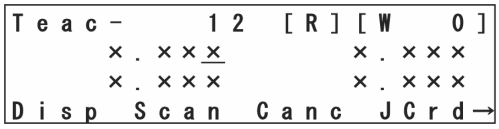


Incorporate the data of the Z-axis and R-axis in the same way.

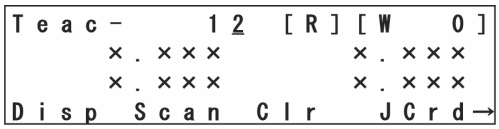


Press the WRT key to transfer the position data to the controller.
The position No. advances to 12.

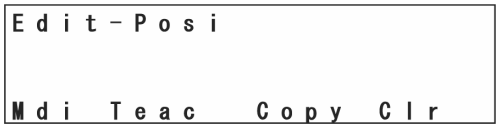
* When the screen is changed with the PAGE UP and PAGE DOWN keys or ESC key before data transfer, the input data becomes invalid.



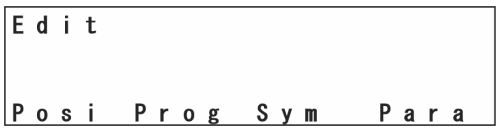
Complete the position data input by teaching.
Press the ESC key.



Press the ESC key.



Press the ESC key.



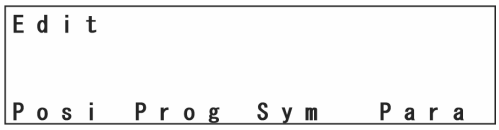
Press the ESC key.

To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the Controller at this time.

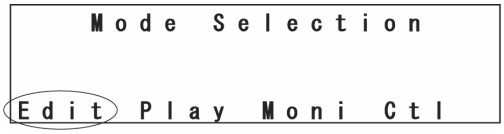
Flash ROM writing is completed.



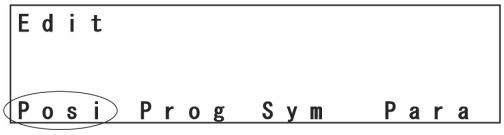
Return to the edit mode screen by pressing the ESC key.

12-4. Copy and movement of position data

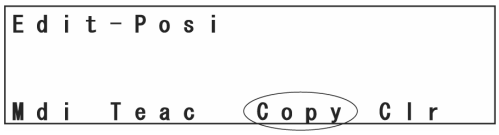
The following operating instructions are to copy or move the position data to another position No.



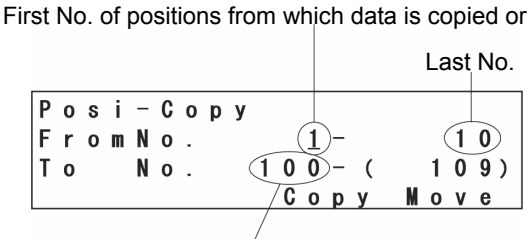
Select the F1 (Edit) key on the Mode Selection screen.



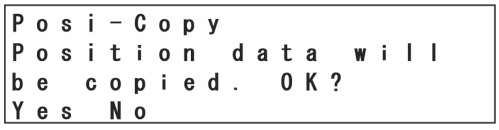
Select the F1 (Posi) key.



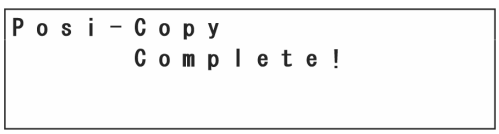
Select the F3 (Copy) key.



Enter the first No. and the last No. of the positions from which data is copied or moved with the 10 key and press the return key.
Enter the first No. of the positions to which data is copied or moved with the 10 key and press the return key.
When copying the data, press the F3 (Copy) key.
When moving the data, press the F4 (Move) key.
The execution confirmation screen will be displayed.



To copy the data, press the F1 (Yes) key. If not, press the F2 (No) key.

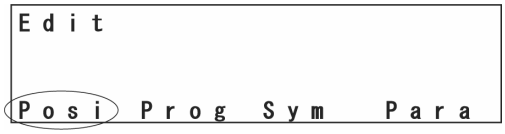


Press the ESC key to return to the previous screen.
When writing the data in Flash ROM, press the ESC key several times to return to the Flsh screen.

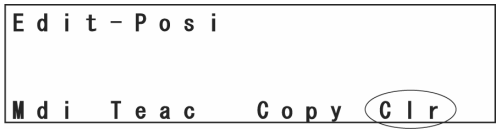
12-5. Deletion of position data

The following operating instructions are to delete the position data.

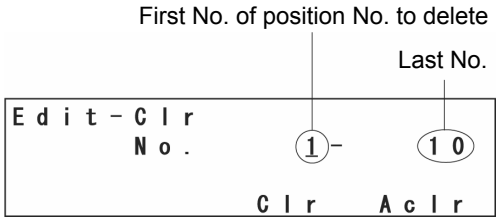
Select the F1 (Edit) key on the Mode Selection screen.



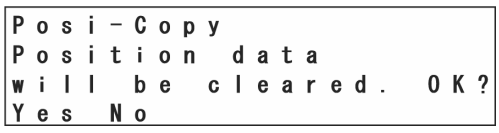
Select the F1 (Posi) key.



Select the F4 (Clr) key.



Enter the first No. and the last No. of the position data to delete with the 10 key and press the return key.
When deleting the selected position data, press the F3 (Clr) key.
When deleting the data for all positions (No. 1 through No. 3000), press the F4(AClr) key.
The execution confirmation screen will be displayed.



To clear the position data, press the F1 (Yes) key. If not, press the F2 (No) key.

Press the ESC key to return to the previous screen.
When writing the data in Flash ROM, press the ESC key several times to return to the Flsh screen.

13. Program Edit (Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

13-1. How to Input Program

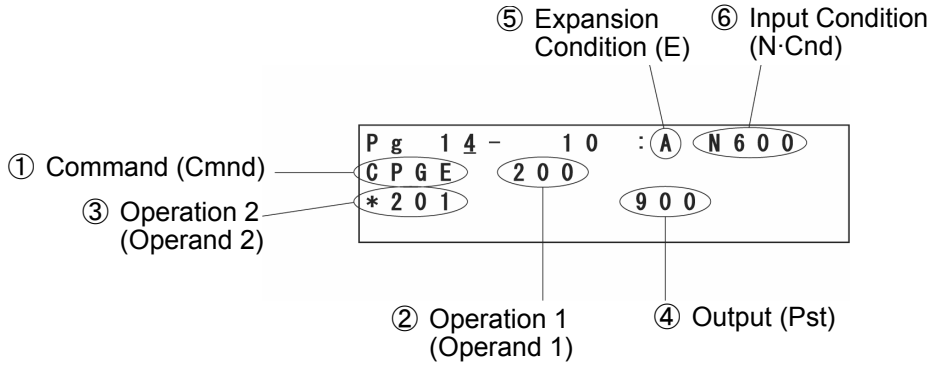
How to input Expansion Condition (E), Input Condition (N·Cnd), and Output (Pst)

The sequence of program inputs for the teaching pendant is different from the program edit screen of the PC software.
The sequence is as ① Command (Cmnd), ② Operation 1 (Operand 1), ③ Operation 2 (Operand 2), ④ Output (Pst), ⑤ Expansion Condition (E) and ⑥ Input Condition (N·Cnd).

PC Software Program Edit Screen

No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
10	A	N	600	CPGE	200	∗201	900	

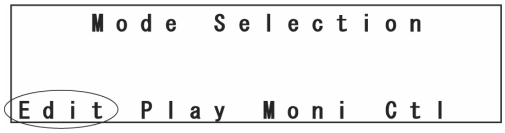
Teaching Pendant LCD Display



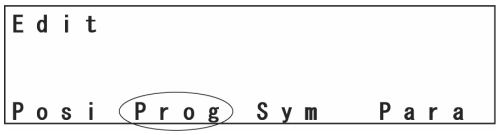
Input the program step below as an example.
Program No. 2

No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1			601					
2	A	N	600	CPGE	200	∗201	900	
3				SCPY	1	’1234		

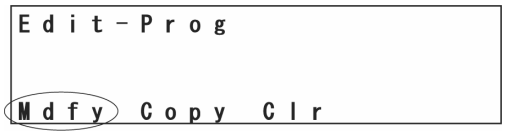
Input only the Input Condition at step No.1 and input data all except Comment at step No.2.



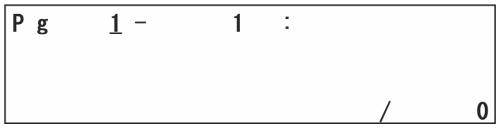
Select the F1 (Edit) key on the mode selection screen.



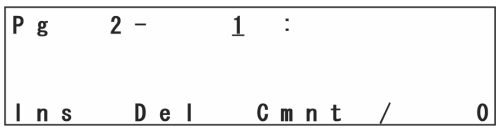
Select the F2 (Prog) key on the edit mode screen.



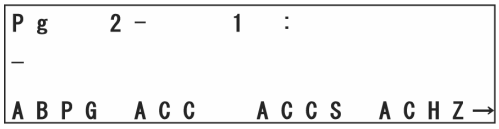
Select the F1 (Mdfy) key on the program edit and new creation screen.



Input the program No. by using the 10 keys and press the return key.

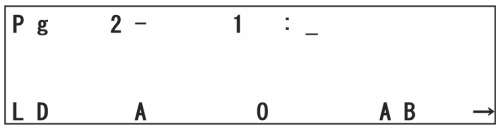


The cursor moves to step No.
Press the return key.



Input section of Cmnd

Press the ▲ key.

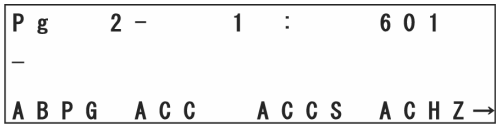


Input section of E

Press the ▶ key or return key.

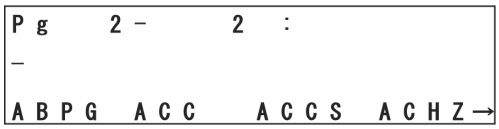
Input section of N·Cnd

Input “601” by using the 10 keys and press the return key.



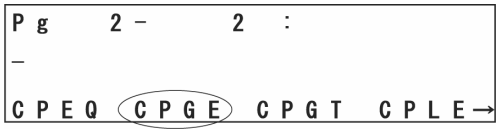
Transmit the data of step No.1 to the controller by pressing the WRT key.
Step No. moves to 2.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

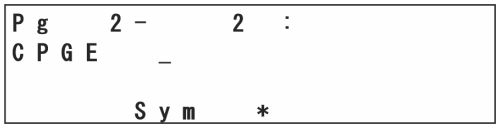


Input section of Cmnd

Display CPGE in the function key area by using the 7 key, SF key and . key.
For searching commands, please refer to section “9-1-2. Programming.”



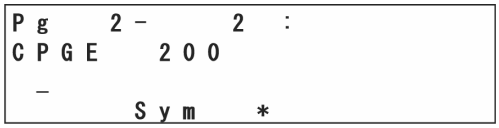
Select the F2 (CPGE) key and press return.



Input section of Operand 1

Input 200 by using the10 keys and press return.

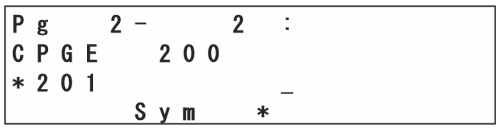
When designating an indirect variable at Operand 1, select the F3(*) key first.



Input section of Operand 2 (Indirect variable designation)

Select the F3 (*) key first. Then input 201 by using the 10 keys and press the return key.

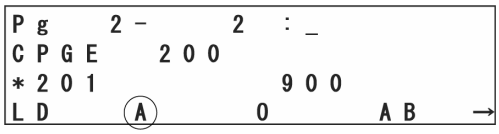
When you input a string at Operand 2, use the same format as Operand1.



Input section of Pst

Input 900 by using the 10 keys and press the return key.

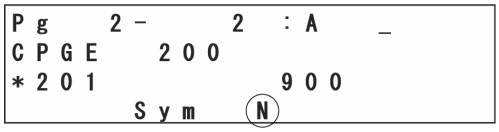
When designating an indirect variable at Operand 1, select the F3 (*) key first.



Input section of E

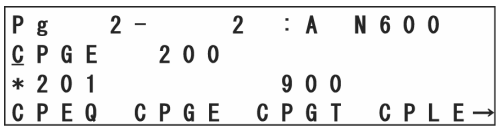
Select the F2 (A) key and press the return key.

Input expansion condition of virtual ladder task on this screen with the function keys as well.



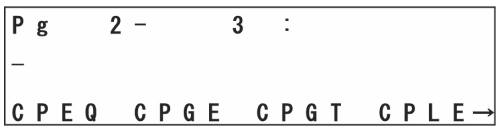
Input section of N·Cnd

Select the F3 (N) key first. Input “600” by using the 10 keys and press the return key.



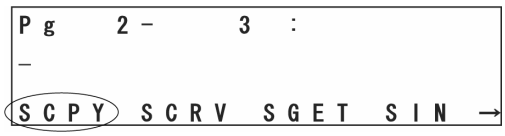
Transmit the data of step No. 2 to the controller by pressing the WRT key.
Step No. moves to 3.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

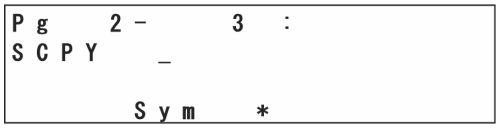


Input section of Cmnd

Display SCPY in the function key area by using the 1 key, SF key and . key.
For searching commands, please refer to section “9-1-2. Programming.”



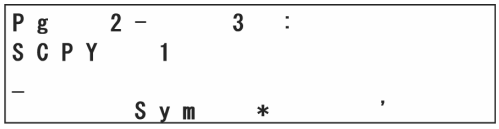
Select the F1 (SCPY) key and press return.



Input section of Operand 1

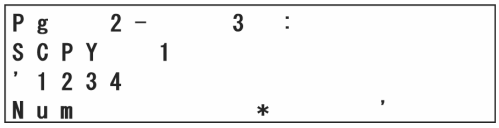
Input 1 by using the10 keys and press return.

When designating an indirect variable at Operand 1, select the F3(*) key first.

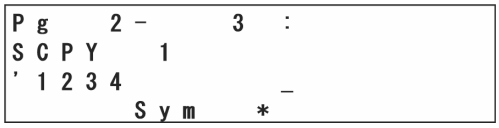


Input section of Operand 2 (Indirect string designation)

Select the F4 (‘) key first. Then input 1234 by using the 10 keys and select the F4 (‘) key and then press the return key.



When you input a string at Operand 2, press the F4 (’) key. “ ’ ” will be input and Num will be displayed in the F1 area.
In the case of Num, you can input a numerical value without change.
Pressing the F1 key changes to F1 (Alph) and you can input the alphabet.



Transmit the data of step No. 3 to the controller by pressing the WRT key.
Step No. moves to 4.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

Finish the program input. Return to the Flash ROM writing screen by using the ESC key.

13-2. Symbol Input during Program Edit

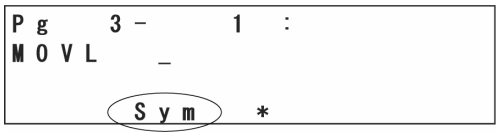
Symbol can be input when the cursor is located at Operand 1 · 2 (operation 1· 2), Pst (output) and Cnd (input condition) in the “Sym” state displayed in the function key area.

Example:
Input symbol of the program step below.

Program No. 3

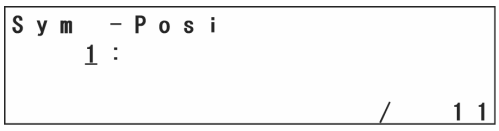
No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1				MOVL	TAIKIITI			

Symbolize position No. 10 as “TAIKIITI.”



Select the F2 (Sym) key in the function key area within the state of the cursor that has been located in the Operand 1 section.
Move to the symbol edit screen.

Select items to edit the symbols with function keys. In this case, since we’re going to the edit the Position No., select the F4 (Posi) key.



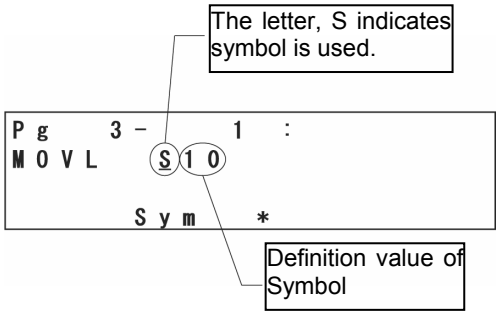
Input 10 for position No. by using the 10 keys and press the return key.

```
Sym  -Posi
   10:  _

Alph                    /   11
```

The 10 keys become alphabet inputs. Input “TAIKIITI.”
For the input procedure, please refer to the section “15. Symbol Edit.”

```
Sym  -Posi
   10:  TAIKIITI

Alph                    /   11
```

Transmit the symbol data to the controller by pressing the WRT key. Return to the edit screen.



The teaching pendant cannot display the input symbol as it is related to the LCD display.
In this case, display “S10” instead of “TAIKIITI.”

In the state where the cursor is located in the symbolized section, if F2 (Sym) key is chosen, it will move to the symbol edit screen. The symbol can then be changed.

```
Pg   3-    2  :
_

ABPG  ACC   ACCS  ACHZ→
```

Transmit the data of this program step to the controller by pressing the WRT key.

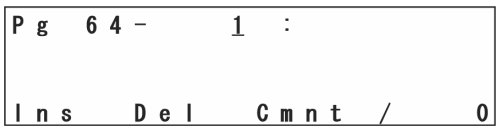
To finish the program input, return to the Flash ROM writing screen by using the ESC key.

13-3. Single Line Comment Input

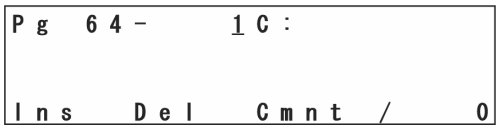
Turns a step from a program into a comment (invalid step) and you can input numbers, alphabets and signs (* · _).

Mode Transition: Edit—Prog—Mdfy—Program No. return

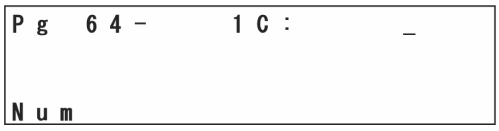
Move the cursor to the step No. for comment input.



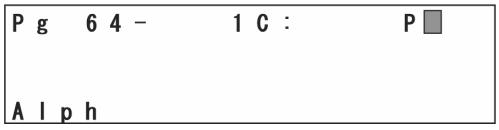
Press the F3 (Cmnt) key.



"C" will be displayed after the step No.
Press the return key.

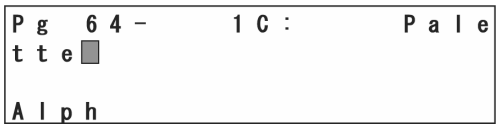


Each time you press the F1 key, the display of the F1 key area switches from "Alph" to 'Num'.

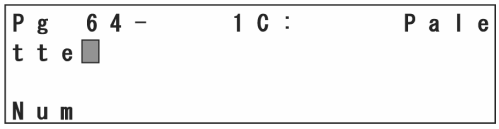


Alphabet input

Display "Alph" in the F1 key area.
Alphabets are allocated to each of the 10 keys.
Ex) Each time you press 6 (POR), display changes P→Q→R→p→q→r→P→ ..... Display the alphabet you would like to input and press the return key. The example of the left displays "P."

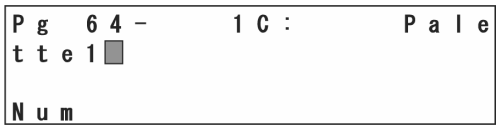


On the left is an example for inputting the word "Palette."
Note: To move to the next line, use the ◀ ▲ ▼ ▶ keys.

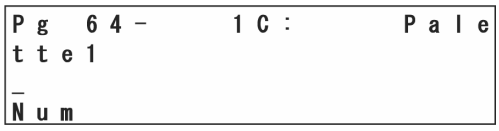


Input numerical value

Display “Num” in the F1 key area.
Input the numerical value by using the 10 keys.

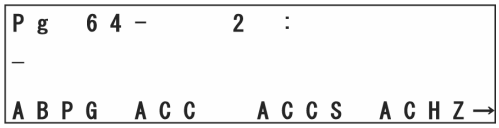


The diagram on the left is an example for inputting “1.”



After finishing the comment input, press the return key again.
Transmit the input data to the controller by pressing the WRT key.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.



The screen moves to the next step No.

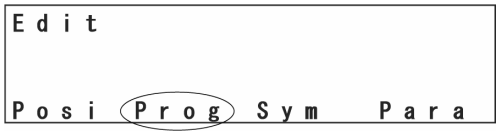
To finish the program input, return to the Flash Rom writing screen by using the ESC key.

Note: Full size character data input by the PC software can’t be displayed on the teaching pendant.

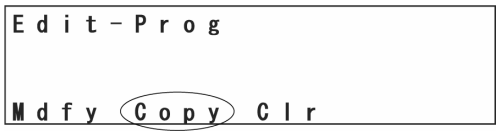
13-4. Program: Copy or Move

The following operating instructions are to copy or move a program to another program No.

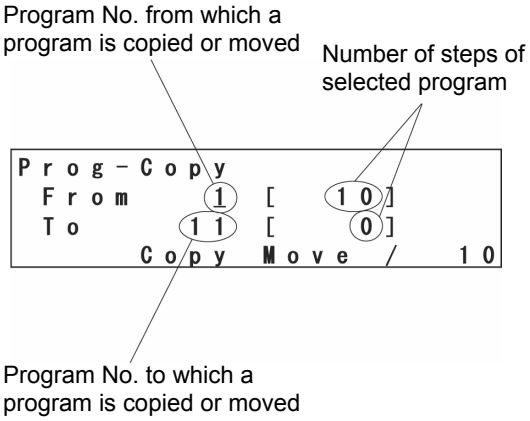
Select the F1 (Edit) key on the mode selection screen.



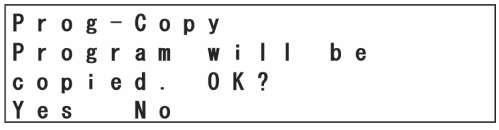
Select the F2 (Prog) key.



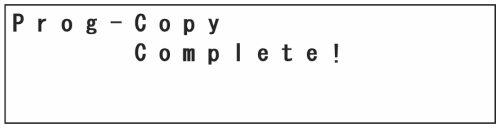
Select the F2 (Copy) key.



Input the program No. from which a program is copied or moved by using the 10 keys and press the return key.
Input the program No. to which a program is copied or moved by using the 10 keys and press the return key.
To copy the program, press the F2 (Copy) key. To move the program, press the F3 (Move) key.
The execution confirmation screen will be displayed.



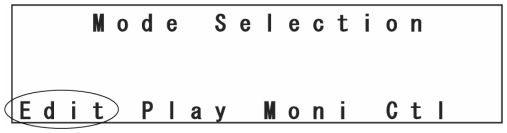
To execute it, press the F1 (Yes) key. To cancel it, Press the F2 (No) key.



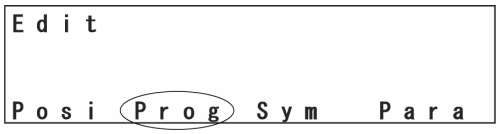
Return to the previous screen with the ESC key.
Furthermore, press the ESC key several times and return to the Flash ROM writing screen.

13-5. Program: Clear

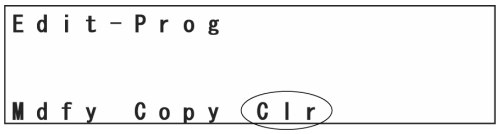
The following operating instructions are to clear a program.



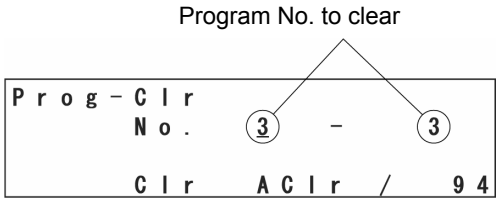
Select the F1 (Edit) key on the mode selection screen.



Select the F2 (Prog) key.



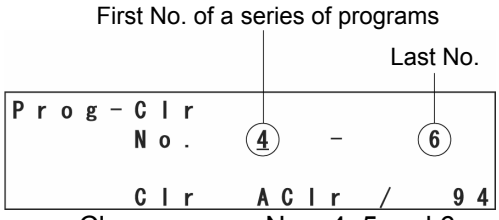
Select the F3 (Clr) key.



Clear program No. 3

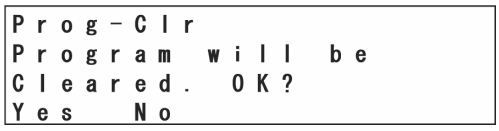
Input the program No. to clear by using the 10 keys and press the return key.

① To clear a single program, press the F2 (Clr) key in the example diagram at the left. The execution confirmation screen will be displayed.
To execute it, press the F1 (Yes) key. To cancel it, Press the F2 (No) key.



Clear program Nos. 4, 5 and 6

② To clear a series of multiple programs, press the F2 (Clr) key in the example diagram at the left. The execution confirmation screen will be displayed.
To execute it, press the F1 (Yes) key. To cancel it, press the F2 (No) key.



③ To clear all programs (No.1 through No. 64), press the F3 (Aclr) key. The execution confirmation screen will be displayed.
To execute it, press the F1 (Yes) key. To cancel it, press the F2 (No) key.

Return to the previous screen with the ESC key.
Furthermore, press the ESC key several times and return to the Flash ROM writing screen.

13-6. Flash ROM Writing

The edit data will be cleared by restoring the power and executing software reset, only if the program edit data was transmitted to the controller.
To save the data after restoring the power and executing software reset, write the data to Flash ROM.
From the final editing screen, return to the Flash ROM writing screen with the ESC key.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

During Flash ROM writing, “Please Wait....” blinks.

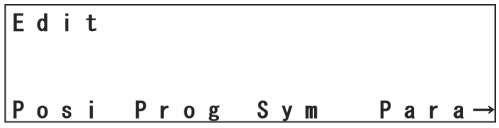
*** Never shut off the power to the controller during Flash ROM writing.**

Flash ROM writing is complete.
Return to the edit mode screen with the ESC key.

14. Coordinate System Data Editing of the SCARA Axis : 1 axis – 4 axis of the X-SEL-KX and PX/QX controller

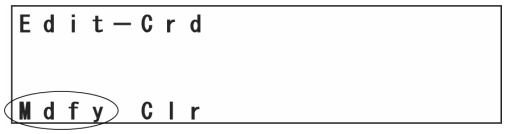
As the coordinate system data of the IX series, there are the work coordinate system data, tool coordinate system data and simple interference check zone.

Select the F1 (Edit) key on the Mode Selection screen.



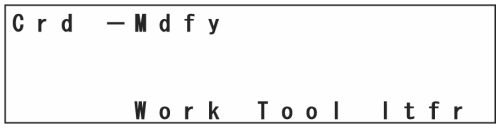
Press the SF key on the Edit mode screen to display Crd.

Press the F1 (Crd) key.



Select the F1 (Mdfy) key.

Coordinate system data selection screen



Select the coordinate system to be edited from this screen.

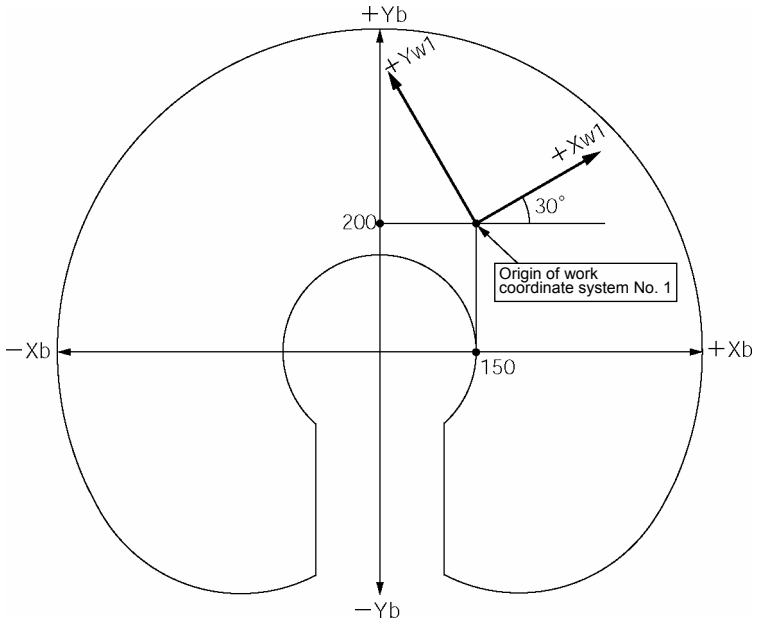
F2 (Work) key: Work coordinate system

F3 (Tool) key: Tool coordinate system

F4 (Itfr) key: Simple interference check zone

14-1. Editing of work coordinate system data

As an input example of the work coordinate system data, a coordinate system as shown below is set for the work coordinate system No. 1.
(Motion range at the arm length 500-type stroke)



The offset values from the work coordinate system No. 1 are Xofw1 = 150, Yofw1 = 200, Zofw1 = 0 and Rofw1 = 30.

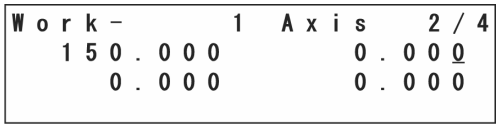
Mode flow: Edit → Crd → Mdfy → Work

```
Work-      1  Axis 1-4/4
     0.000          0.000
     0.000          0.000
```

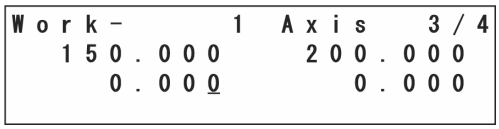
This is the work coordinate system No. selection screen.
The cursor is located at the work coordinate system No.
To select the work coordinate system No., enter the No. with the 10 key or the PAGE UP and PAGE DOWN keys, and confirm it with the return key.
This example indicates the setting of the work coordinate system No. 1.
Press the return key as it is.

```
Work-      1  Axis   1/4
     0.000          0.000
     0.000          0.000
```

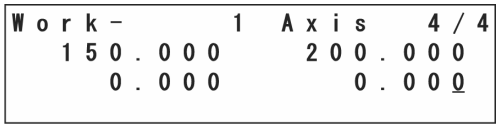
The cursor is located at the X-axis offset value data.
Enter 150 and press the return key.



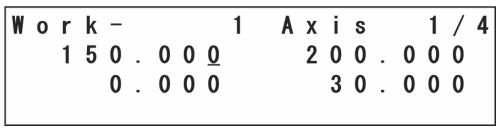
The cursor is located at the Y-axis offset value data.
Enter 200 and press the return key.



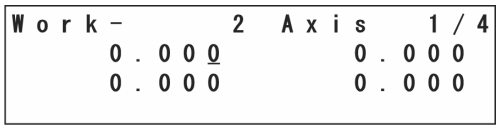
The cursor is located at the Z-axis offset value data.
Enter 0 and press the return key.



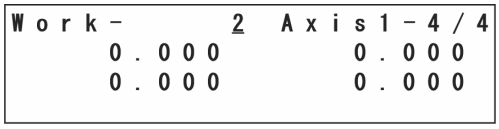
The cursor is located at the R-axis offset value data.
Enter 30 and press the return key.



Transfer the data with the WRT key.
The screen advances to the edit screen for the work coordinate system No. 2.

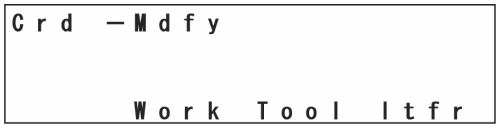


Complete editing of the work coordinate system data and write data in Flash ROM.
Pressing the ESC key moves the cursor to the location of the work coordinate system No.



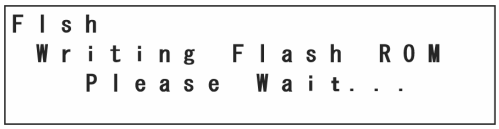
Pressing the ESC key returns the cursor to the coordinate system data selection screen.

Coordinate system data selection screen



Pressing the ESC key again returns to the Flash ROM writing screen.
(Return by 3 screens)

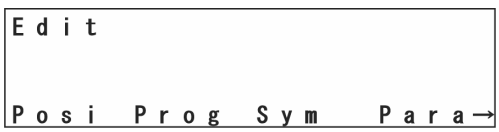
To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.



The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the Controller at this time.

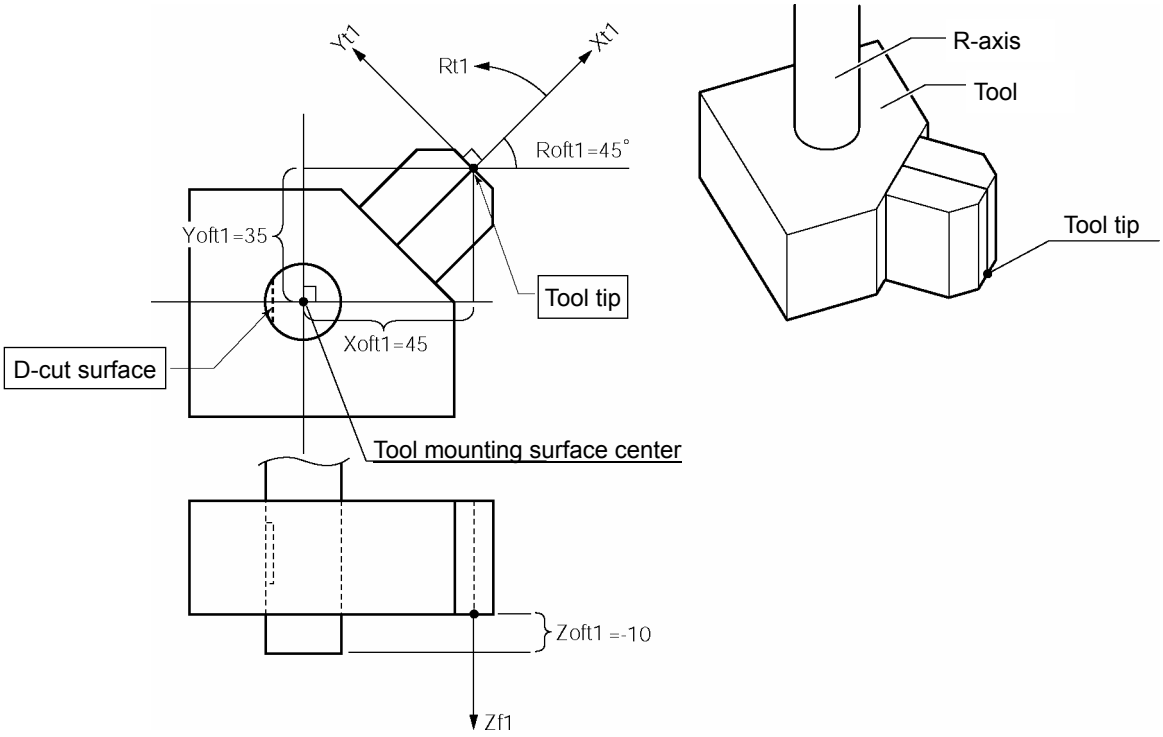
Flash ROM writing is completed.



Return to the edit mode screen with the ESC key.

14-2. Editing of tool coordinate system data

As an input example of the tool coordinate system data, a tool as shown below is set for the tool coordinate system No. 1.



The offset values from the tool coordinate system No. 1 become Xoft1 = 45, Yoft1 = 35, Zoft1 = -10 and Roft1 = 45.

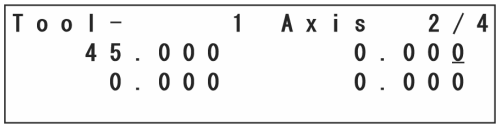
Mode flow: Edit → Crd → Mdfy → Tool

```
Tool-      1  Axis 1-4/4
      0.000          0.000
      0.000          0.000
```

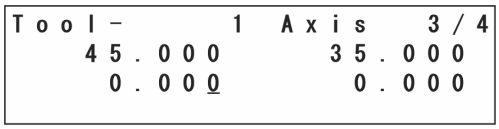
This is the tool coordinate system No. selection screen.
The cursor is located at the tool coordinate system No.
To select the tool coordinate system No., enter the No. with the 10 key or the PAGE UP and PAGE DOWN keys, and confirm it with the return key.
This example indicates the setting of the tool coordinate system No. 1.
Press the return key as it is.

```
Tool-      1  Axis   1/4
      0.000          0.000
      0.000          0.000
```

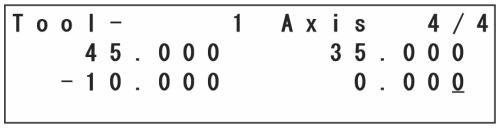
The cursor is located at the X-axis offset value data.
Enter 45 and press the return key.



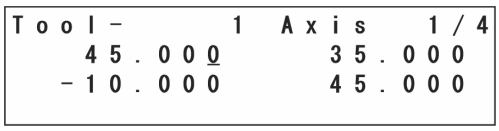
The cursor is located at the Y-axis offset value data.
Enter 35 and press the return key.



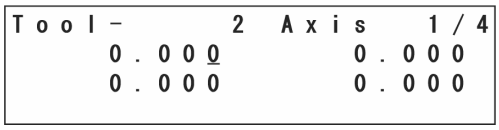
The cursor is located at the Z-axis offset value data.
Enter -10 and press the return key.



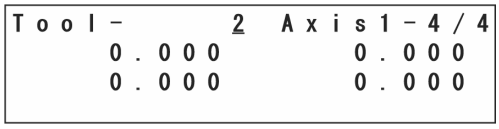
The cursor is located at the R-axis offset value data.
Enter 45 and press the return key.



Transfer the data with the WRT key.
The screen advances to the edit screen for the tool coordinate system No. 2.

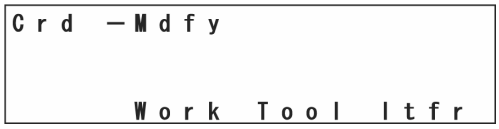


Complete editing of the tool coordinate system data and write data in Flash ROM.
Pressing the ESC key moves the cursor to the location of the tool coordinate system No.



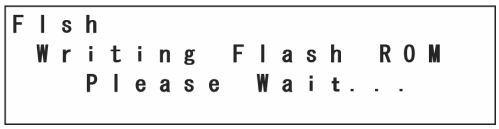
Pressing the ESC key returns the cursor to the coordinate system data selection screen.

Coordinate system data selection screen



Pressing the ESC key again returns to the Flash ROM writing screen.
(Return by 3 screens)

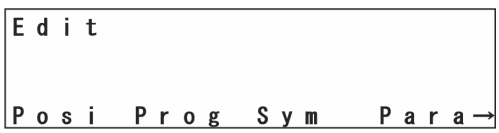
To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.



The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the Controller at this time.

Flash ROM writing is completed.



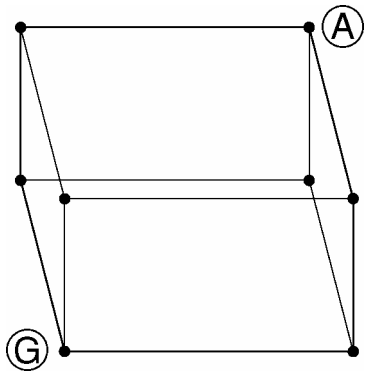
Return to the edit mode screen with the ESC key.

14-3. Editing of simple interference check zone

It is required to input the following 3 items to set the simple interference check zone:

- 2-point position data to define the zone. (Input the values of the base coordinate system.)
- Output port No. or global flag No. for output during zone invasion.
- Error type at zone invasion time. (0: No error-handling, 1: Message level error, 2: Motion reset level error.)

As an input example of the simple interference check zone, a zone as shown below is set for the simple interference check zone No. 1.

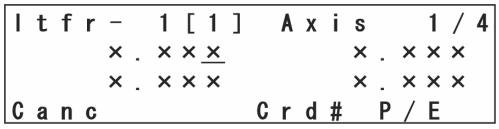


Base coordinate values of Ⓐ: Xb = 475, Yb = -50, Zb = 150, Rb = 0
Base coordinate values of Ⓖ: Xb = 400, Yb = 50, Zb = 200, Rb = 180
Output port for output during zone invasion: No. 311
Error type at zone invasion time: 1

Mode flow: Edit → Crd → Mdfy → Itfr

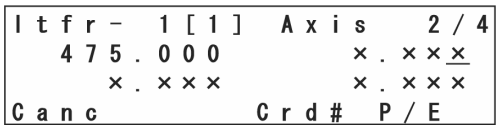
```
Itfr-  1[1]  Axis1-4/4
      ×.×××       ×.×××
      ×.×××       ×.×××
Canc          Crd#  P/E
```

This is the simple interference check zone No. selection screen.
The cursor is located at the simple interference check zone No.
To select the simple interference check zone No., enter the No. with the 10 key or the PAGE UP and PAGE DOWN keys, and confirm it with the return key.
This example indicates the setting of the simple interference check zone No. 1.
Press the return key as it is.

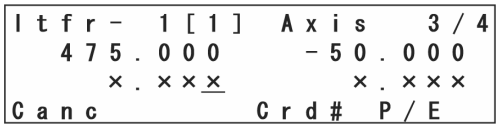


Input of base coordinate values of Ⓐ

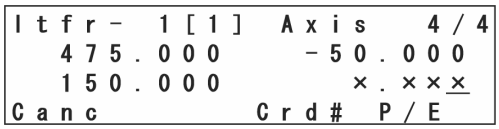
The cursor is located at the X-axis data.
Enter 475 and press the return key.



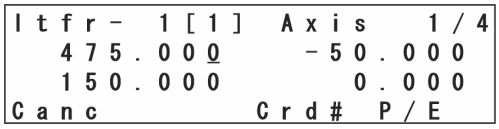
The cursor is located at the Y-axis data.
Enter -50 and press the return key.



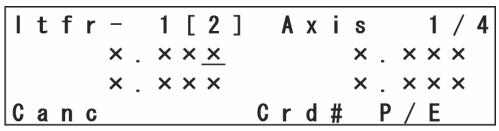
The cursor is located at the Z-axis offset value data.
Enter 150 and press the return key.



The cursor is located at the R-axis offset value data.
Enter 0 and press the return key.

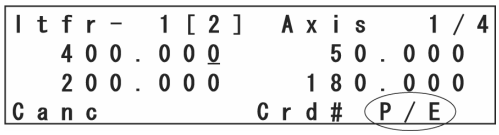


Press the F3 (Crd#) key to input the other position data.



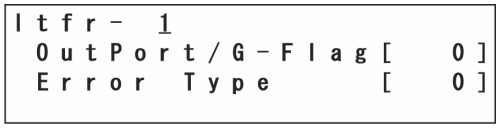
Input of base coordinate values of Ⓖ

Enter the base coordinate values of Ⓖ in the same way as A.



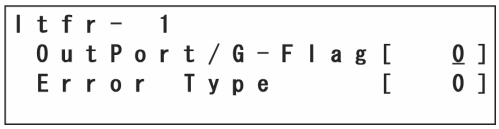
Set the output port/global flag and error type during zone invasion

Press the F4 (P/E) key.

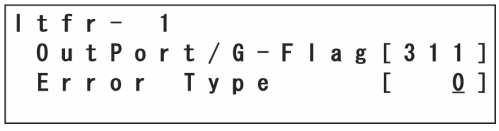


Output port/global flag No. and error type input screen

Press the return key.



Enter the output port No. 311 and press the return key.



Enter the error type 1 and press the return key.

```
Itfr- 1
 OutPort/G-Flag[311]
 Error Type     [  1]
```

Transfer the data with the WRT key.
The screen advances to the edit screen for the simple interference check zone No. 2.
When the axial pattern of Ⓐ does not agree with that of Ⓖ, the “9FO” error occurs.
When the axial pattern of Ⓐ and Ⓖ is 0, the “9F1” error occurs if the output port or error type is specified.

```
Itfr- 2
 OutPort/G-Flag[  0]
 Error Type     [  0]
```

Complete editing of the tool coordinate system data and write the data in Flash ROM.
Pressing the ESC key moves the cursor to the location of the simple interference check zone No.

```
Itfr- 2
 OutPort/G-Flag[  0]
 Error Type     [  0]
```

Pressing the ESC key returns the cursor to the coordinate value input screen.

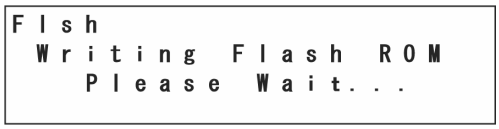
```
Itfr- 2[2] Axis  1/4
     ×.××××      ×.×××
     ×.×××       ×.×××
Canc         Crd#  P/E
```

Pressing the ESC key moves the cursor to the location of the tool coordinate system No.

```
Itfr- 2[2] Axis1-4/4
     ×.×××       ×.×××
     ×.×××       ×.×××
Canc         Crd#  P/E
```

Pressing the ESC key again returns to the Flash ROM writing screen.
(Return by 4 screens)

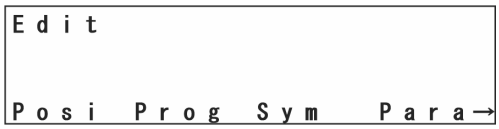
To write the data in Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.



The message “Please wait…” flashes during Flash ROM writing.

* Never turn off the power to the Controller at this time.

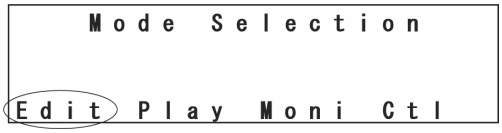
Flash ROM writing is completed.



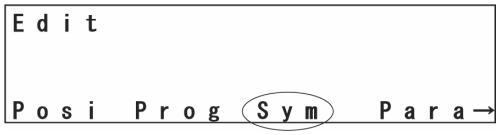
Return to the edit mode screen with the ESC key.

15. Symbol Edit (Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

Symbol (Names) can be applied to variables, input ports, flags, position, etc., in SEL controller.

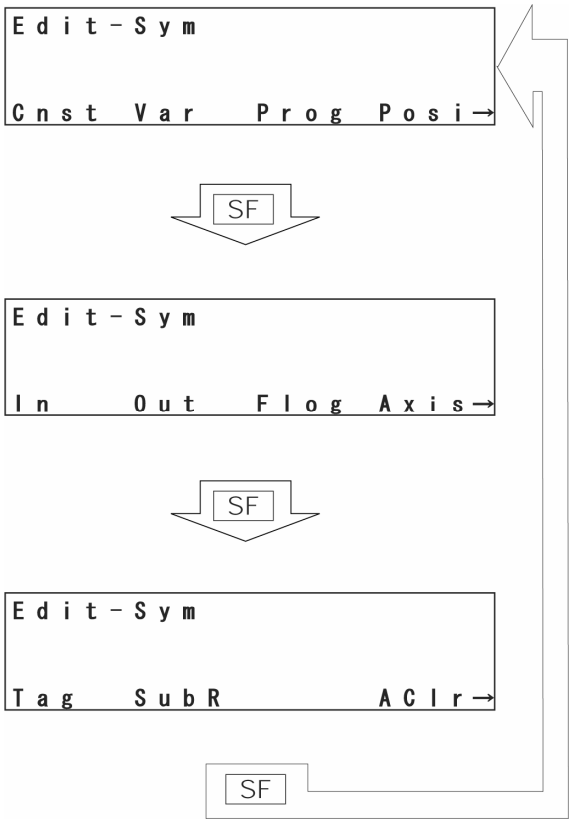


Select the F1 (Edit) key.



Select the F3 (Sym) key.

15-1. Symbol Edit Items



Symbolized items will be displayed in the function key area. Each time by pressing SF key, items are shifted and displayed.

Symbol Edit Items

Cnst:	Constant number
Var:	Variable
Prog:	Program No.
Posi:	Position No.

In:	Input port No.
Out:	Output port No.
Flag:	Flag No.
Axis:	Axis No.

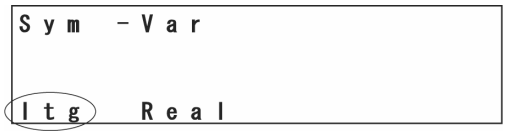
Tag:	Tag No.
SubR:	Subroutine No.
Aclr:	All clear Clear all the symbol data.

Display the list of items to symbolize by using the SF (shift) key and select with the function keys.

15-2. Input Example: Symbolize Local Integer Variable

Symbolize Variable No. 5 of program No. 3 to “Cnt5.” Press the F2 (Var) key.

Mode Transition: Edit—Sym—Var



Select an integer or real number.
Press the F1 (Itg) key.
(Itg: Integer, Real: Real number)

Number of defined symbols

The cursor is located at program No.
Input the local area program No.
(To symbolize global area, leave 0.)
Input 3 and press the return key.

Variable No.

Local area program No.

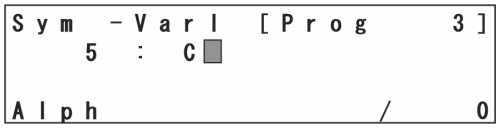
The cursor is located at variable No.
Input 5 and press the return key.

Alphabet input

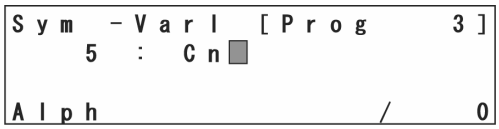
Input the symbol name “Cnt5.”

How to input

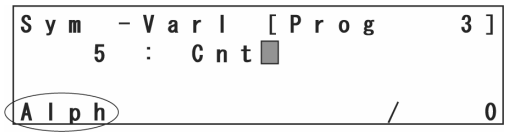
Alphabets are allocated to each of the 10 keys. Each time by pressing ABC 7 of the 10 key, It changes A→B→C→a→b→c→A ....
Display “C” and press the return key.



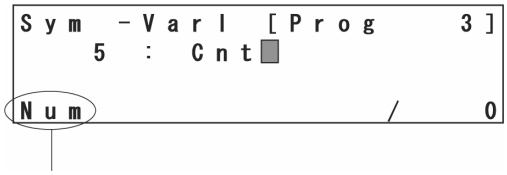
Press [MNO 5] several times to display “n.”
Press the return key.



Press the [STU 1] (10 keys) several times to display “t.”
Then press the return key.

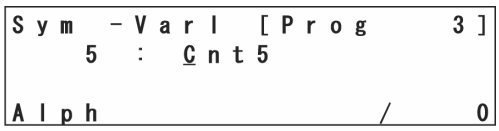


The F1 key area display changes to Num by pressing the F1 (Alph) key. It becomes a numerical input.



Input 5 by using the 10 keys.

Press the return key to determine the symbol name.

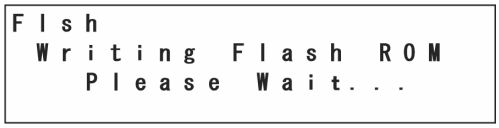


After determining symbol name, the cursor moves to the top letter.
If it's before determination, you can correct the letters one by one with the BS key.
After determination, the name is corrected by overwriting all the characters.
Transmit the symbol data to the controller by pressing the WRT key.

* If you change the screen with the PAGE UP · PAGE DOWN or ESC keys before transmitting the data, the input data will be invalid.

To finish edit, return to the Flash ROM writing screen with the ESC key.

Press the F1 (Yes) to write the data to Flash ROM.
If not, press F2 (No) key.



During Flash ROM writing, "Please Wait...." blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Return to the edit mode screen with the ESC key.

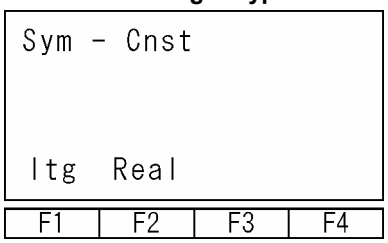
15-3. Symbol Edit Screen of Each Items

(1) Constant Number

Select the F1 (Cnst) key on the constant number symbol edit item screen.

Mode Transition: Edit–Sym–Cnst

Selection of Integer Type · Real Number Type Constant Number



Select an integer or real number.

F1 (Itg): Integer
F2 (Real): Real Number

① Integer Type Constant Number

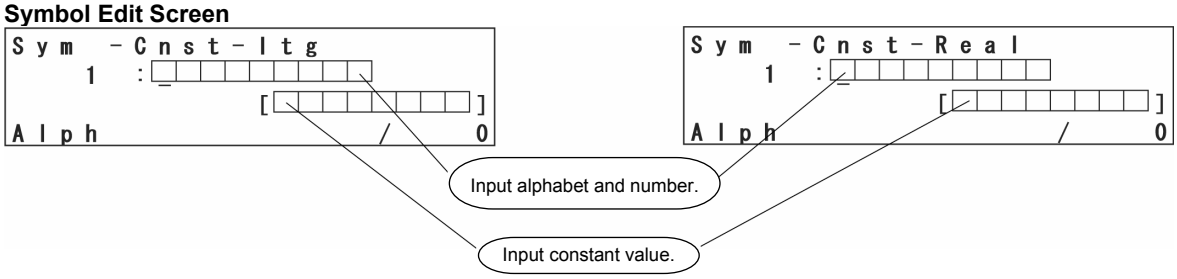
Mode Transition: Edit–Sym–Cnst–Itg

Integer Type Constant Number Symbol Edit Screen

② Real Number Type Constant Number

Mode Transition: Edit–Sym–Cnst–Real

Real Type Constant Number Symbol Edit Screen

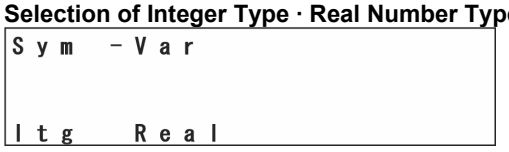


(2) Variable

Select the F2 (Var) key on the variable symbol edit item screen.

Mode Transition: Edit–Sym–Var

Selection of Integer Type · Real Number Type Variable



Select an integer or real number.

F1 (Itg): Integer
F2 (Real): Real Number

① Integer Type Variable No.

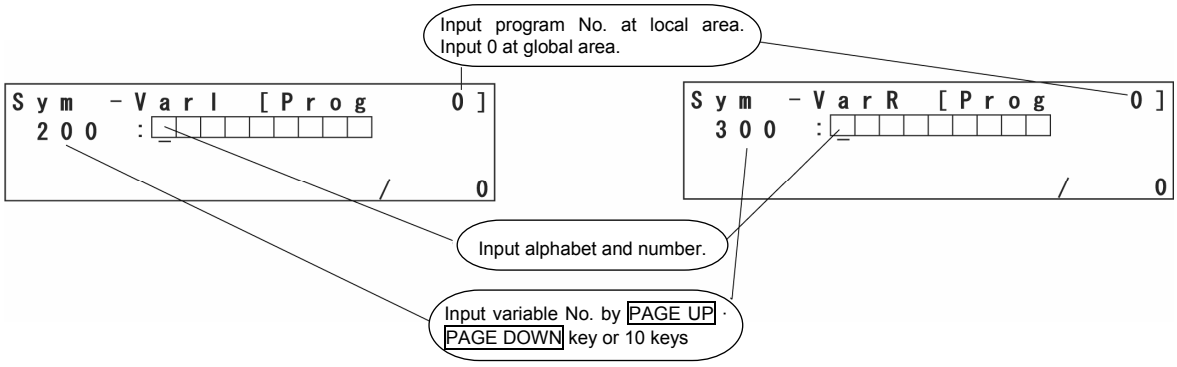
Mode Transition: Edit–Sym–Var–Itg

Integer Type Variable No. Symbol Edit Screen

② Real Number Type Variable No.

Mode Transition: Edit–Sym–Var–Real

Real Number Type Variable No. Symbol Edit Screen

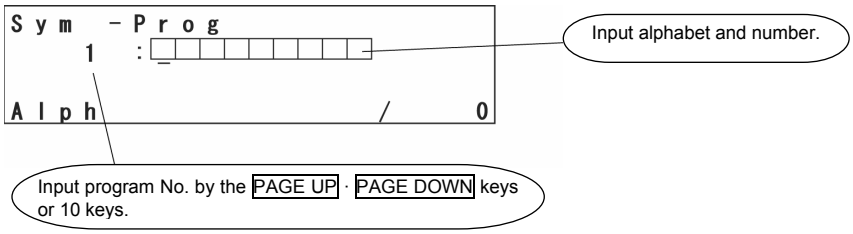


(3) Program

Select the F3 (Prog) key on the symbol edit item screen.

Mode Transition: Edit–Sym–Prog

Program No. Symbol Edit Screen

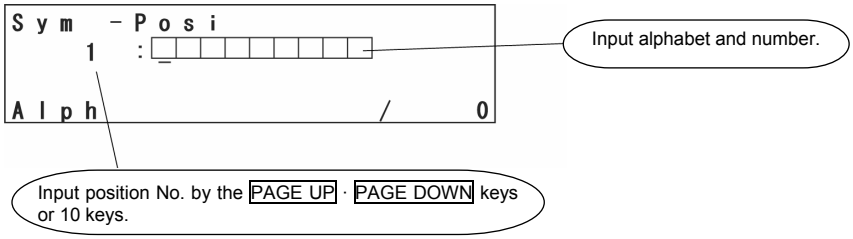


(4) Position

Select the F4 (Posi) key on the symbol edit item screen.

Mode Transition: Edit–Sym–Posi

Position No. Symbol Edit Screen

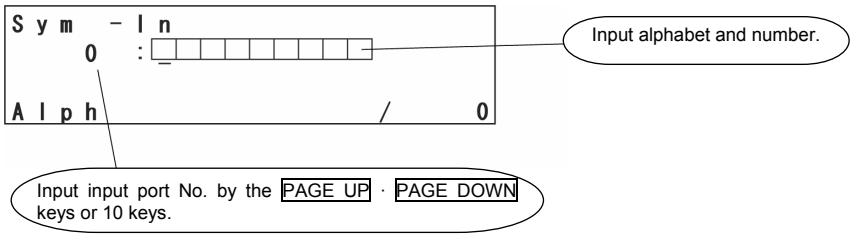


(5) Input Port

Select the F1 (In) key on the symbol edit item screen.

Mode Transition: Edit–Sym–In

Input Port No. Symbol Edit Screen

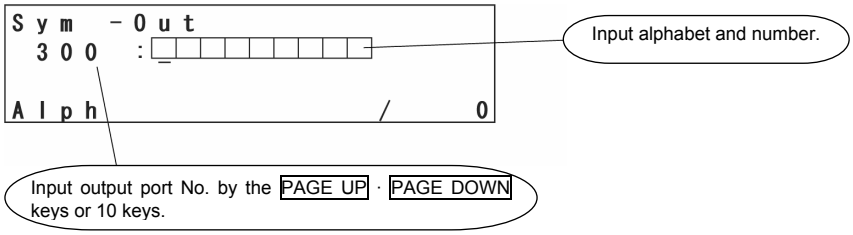


(6) Output Port

Select the F2 (Out) key on the symbol edit item screen.

Mode Transition: Edit—Sym—Out

Output Port No. Symbol Edit Screen

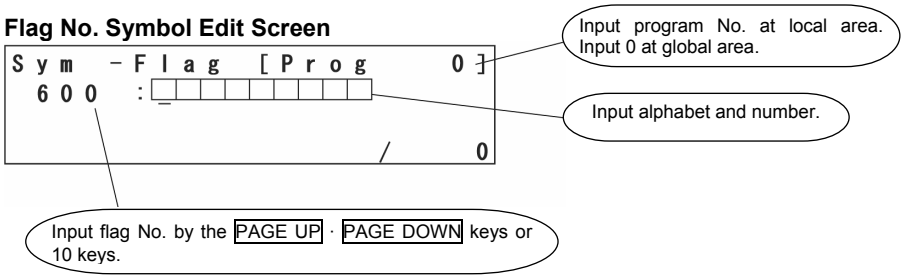


(7) Flag

Select the F3 (Flag) key on the symbol edit item screen.

Mode Transition: Edit—Sym—Flag

Flag No. Symbol Edit Screen

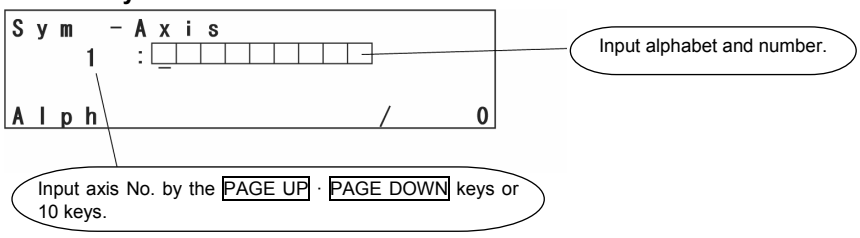


(8) Axis

Select the F4 (Axis) key on the symbol edit item screen.

Mode Transition: Edit—Sym—Axis

Axis No. Symbol Edit Screen

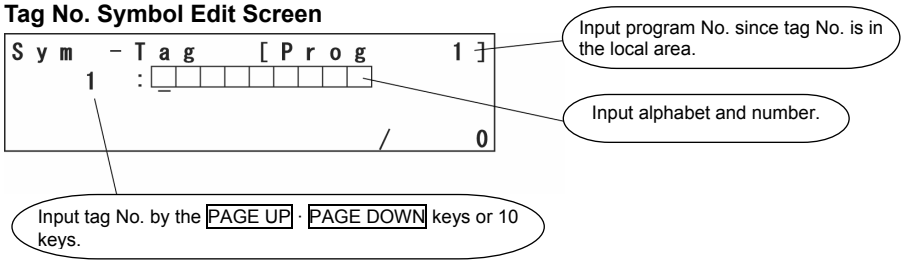


(9) Tag

Select the F1 (Tag) key on the symbol edit item screen.

Mode Transition: Edit–Sym–Tag

Tag No. Symbol Edit Screen

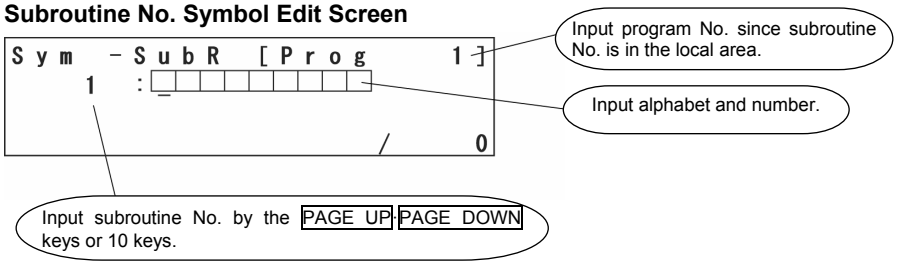


(10) Subroutine

Select the F2 (SubR) key on the symbol edit item screen.

Mode flow: Edit–Sym–SubR

Subroutine No. Symbol Edit Screen



(11) All Clear

Select the F4 (Aclr) key on the symbol edit item screen.

Mode Transition: Edit–Sym-Aclr

All Clear Screen

To clear all symbols, select the Yes key.
To cancel them, select the No key.

If the Yes key is selected, all the symbol data will be cleared and “Complete!” will be displayed.

15-4 Flash ROM Writing

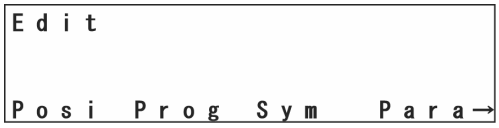
The edit data will be cleared by restoring power and executing software reset, only if the symbol edit data was transmitted to the controller.
To save the data after restoring the power and executing software reset, write the data to Flash ROM.
From the final editing screen, return to the Flash ROM writing screen with the ESC key.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Flash ROM writing is completed.



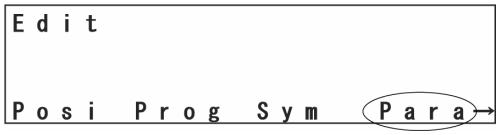
Return to the edit mode screen with the ESC key.

16. Parameter Edit

You can change the parameters corresponding to your system.
When you change the parameters by yourself, please note the parameter contents.

Note: In the case of SSEL, ASEL or PSEL in the positioner mode, parameter transfer cannot be performed when the controller is executing.
Stop the controller before changing or transferring parameters.
To stop the controller, select “Positioner Mode” from “Controller” in the menu and click “Stop.”

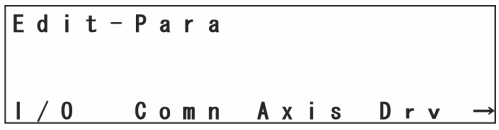
Select the F1 (Edit) key on the mode selection screen.

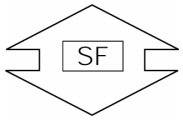


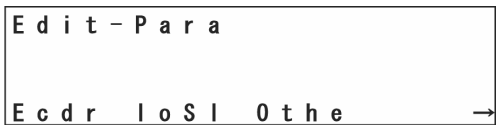
Select the F4 (Para) key on the edit mode screen.

16-1. Parameter Edit Items

Parameter items will be displayed in the function key area.
Each time by pressing the SF key, items will be shifted and displayed.







Parameter Edit Items

I/O:	I/O parameter
Comn:	All-axis common parameter
Axis:	Each-axis parameter
Drv:	Driver card parameter

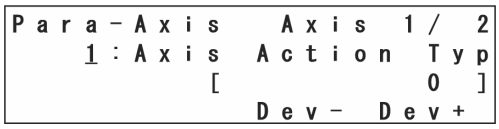
Ecdr:	Encoder parameter
IoSl:	I/O slot card parameter
Othe:	Other parameter

Select the parameter item to edit with function key.

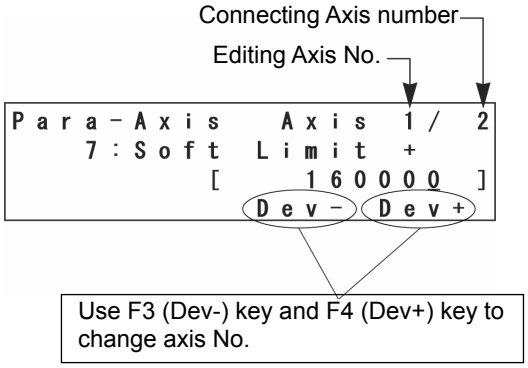
16-2. Input Example: Edit Each-Axis Parameter

Set the soft limit + for the first and second axis of each-axis parameter No.7, 300mm and 200mm. Select the F3 (Axis) key on the parameter edit screen.

Mode Transition: Edit — Para — Axis



The cursor is located at the parameter No.
Input 7 by using the10 keys and press the return key.

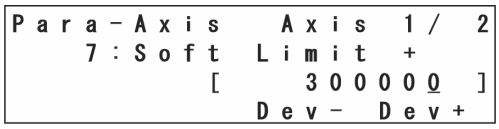


It becomes the soft limit + of each-axis parameter No.7 edit screen. The cursor is located at the parameter data.

Input data of axis No. 1

Depending on the parameter items, set the parameter by axis or I/O board.
(Each-axis parameter, driver card parameter, encoder parameter, and I/O slot card parameter.)
Confirm that the screen is the first axis edit screen.

Input 300000 and press the return key.
(Unit: 0.001mm)

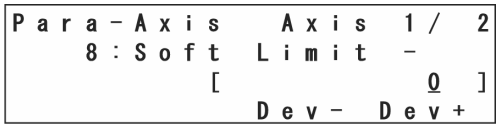


Transmit the parameter data to the controller by pressing the WRT key.

Note:

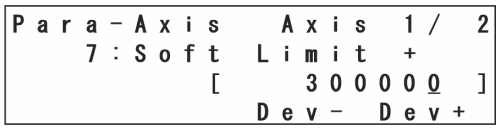
One transfer (WRT key) with the Teaching Pendant saves the data only on the current screen in memory. Therefore, it is required to input the parameter data and transfer it by axis (device).

Un-transmitted data will be invalid when switching the screen.

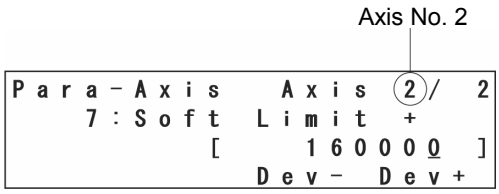


Input data of axis No. 2

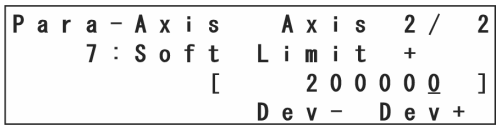
The display screen moves to parameter No. 8. Axis No. 2 of parameter No. 7 is not edited yet, so, return to the parameter No. 7 edit screen with the PAGE DOWN key.



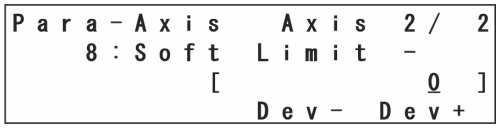
Change the axis No. to 2 by using the F4 (Dev+) key.



Input 200000 by using the 10 keys and press the return key.



Transmit the parameter data to the controller by pressing the WRT key.



To continue editing each-axis parameter, move the cursor to the parameter No. and input the parameter No. to edit.
To finish each-axis parameter edit, return to the Flash ROM writing screen with the ESC key.

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key.

During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

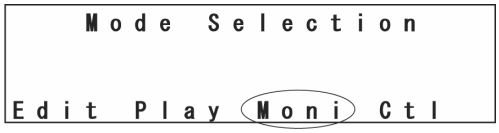
After writing the data to Flash ROM, the screen changes to the software reset screen.
To have a valid changed parameter, execute a software reset. Press the F1 (Yes) key.

During software reset, “Please wait...” blinks.

When the software reset is complete, it returns to the mode selection screen.

17. Monitor

Monitor each status, global variable, port status, etc.



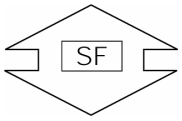
Select the F3 (Moni) key from The mode selection screen.

17-1. Monitor Items

Monitor items will be displayed in the function key area.
Each time by pressing the SF key, items will be shifted and displayed.

Monitor Items Screen

In:	Input port
Out:	Output port
GFlg:	Global flag
GVar:	Global variable

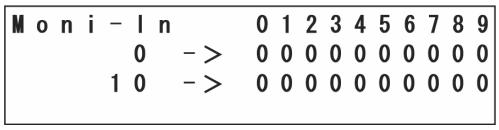


Asts:	Axis status
SSts:	System status
ErrL:	Error detail information
Ver:	Version information

Select the item to monitor with the function key.

17-2. Input Port

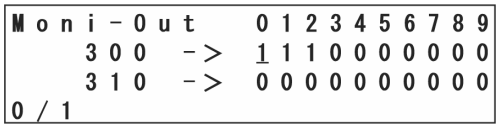
Display the ON/OFF status of input port.
Select the F1 (In) key on the monitor items screen.
Mode Transition: Moni — In



1: ON, 0: OFF
Each time the PAGE UP · PAGE DOWN keys are pressed, the 20 port numbers are scrolled.

17-3. Output Port

Displays the ON/OFF status of the output port. Also, it can switch the ON/OFF status of the output port.
Select the F2 (Out) key on the monitor items screen.
Mode Transition: Moni — Out

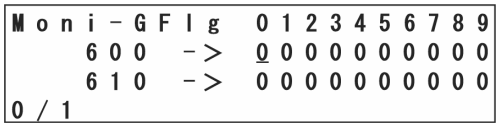


The diagram above is the screen showing output port Nos. 300~302 ON.

The output port where the cursor is located can be switched ON/OFF status each time by pressing the F1 (0/1) key.
1: ON, 0: OFF
The cursor location can be moved with return key or ◀ ▲ ▼ ▶ key.
Each time the PAGE UP · PAGE DOWN keys are pressed, 20 port numbers are scrolled.

17-4. Global Flag

Displays the ON/OFF status of global flag. Also, it can switch the ON/OFF status of the global flags.
Select the F3 (GFlg) key on the monitor items screen.
Mode Transition: Moni — GFlg



Global flags where the cursor is located can be switched ON/OFF each time by pressing the F1 (0/1) key.
1: ON, 0: OFF
The cursor location can be moved by return key or ◀ ▲ ▼ ▶ key.
Each time the PAGE UP · PAGE DOWN keys are pressed, 20 flags numbers are scrolled.

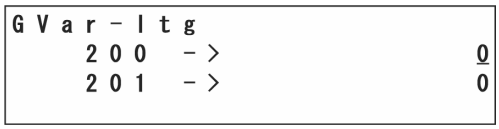
17-5. Global Variable

Displays the contents of global variable and global string. Also, a numerical value can be substituted for a global variable and letter string can be substituted for a global string.
Select the F4 (GVar) key on the monitor items screen.
Mode Transition: Moni — GVar

3 kinds of global variables are displayed:
Itg: Integer Type (No. 200~299, No.1200~1299)
Real: Real Number Type (No. 300~399, No. 1300~1399)
Str: String (No. 300~999)

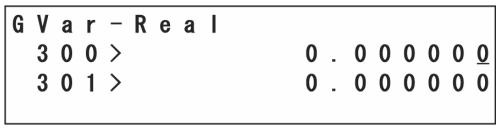
(1) Global Integer Type Variable

Mode Transition: Moni — GVar — Itg



(2) Global Real Number Type Variable

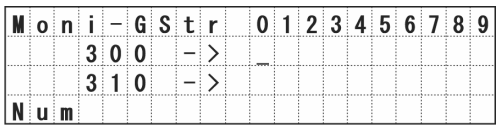
Mode Transition: Moni — GVar — Real



The cursor is located in the data column (variable content). To substitute a value, input numerical value by using the 10 keys and press the return key. The cursor location can be moved with the return key and ◀ ▲ ▼ ▶ key.
The variable No. can be changed with the PAGE UP · PAGE DOWN keys.

(3) Global String

Mode Transition: Moni — GVar — Str



The cursor is located in the data column.
To substitute letters, input the ASCII code by using the 10 keys and press the return key. (Input hexadecimal, A~F after switching to Alph with the F1 (Alph/Num) key.)
The cursor location can be moved with the return key and ◀ ▲ ▼ ▶ key. Each time by pressing the PAGE UP · PAGE DOWN keys, the column scrolls 20 rows.

17-6. Axis Status

Displays the current position of each axis, servo status, sensor status, etc.
The status items may vary depending on the model.
Select the F1 (ASts) key from the monitor items screen.

Mode Transition: Moni → ASts

```
Moni-ASts

Posi  Srvo  Snsr  Ecdr→
```

Posi:	Current Position
Srvo:	Servo Status
Snsr:	Sensor Input Status
Ecdr:	Encoder Status

SF

```
Moni-ASts

ErrA                  →
```

ErrA:	Axis Related Error

(1) Current position

Mode Transition: Moni → ASts → Posi

```
Position      Axis1-2/2
   115.788F       0.049F

                    Crd
```

Orthogonal axis

```
Position      [R][W    0]
   115.788F       0.049F
    61.266F      36.770F
                    Crd
```

SCARA axis

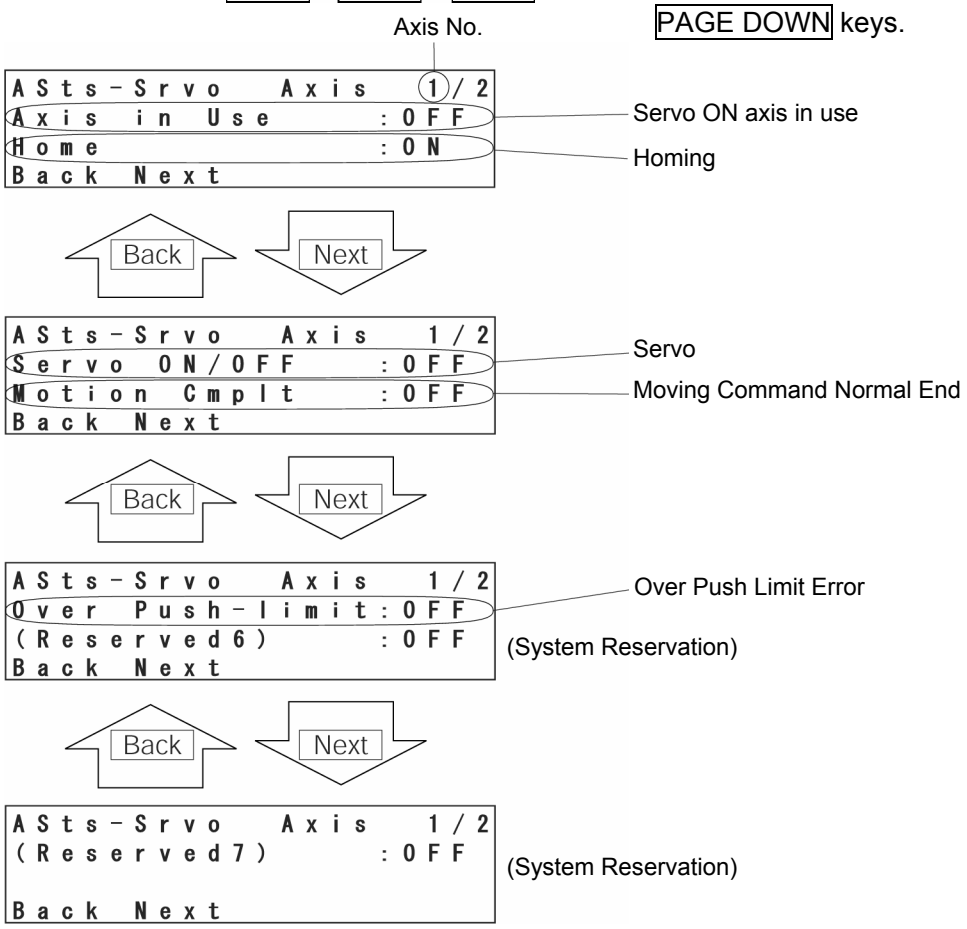
N: Servo ON

F: Servo OFF

(2) Servo status

Mode Transition: Moni — ASts — Srvo

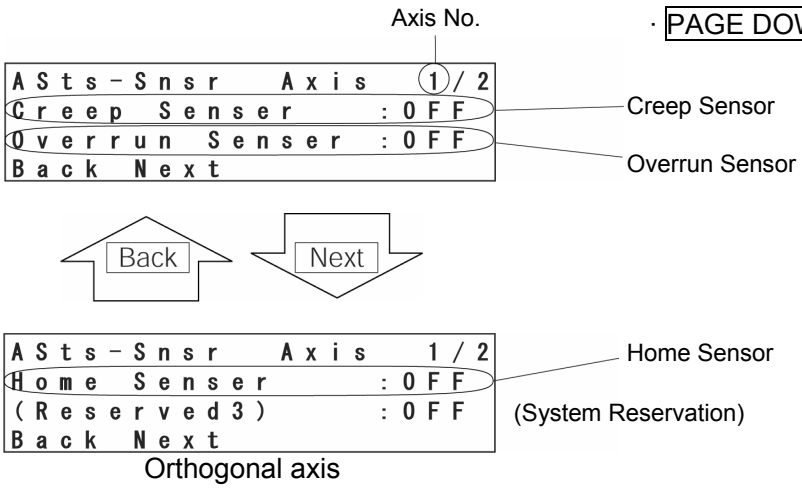
Axis No. can be switched with the PAGE UP · PAGE DOWN keys.



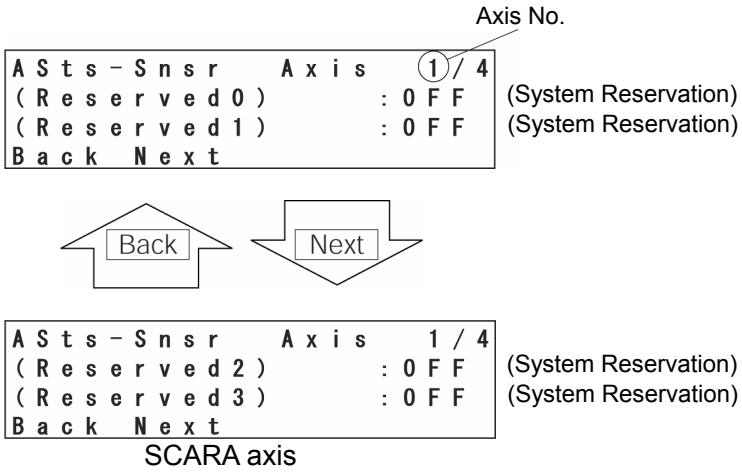
(3) Sensor Input Status

Mode Transition: Moni — ASts — Snsr

Axis No. can be switched with the PAGE UP · PAGE DOWN keys.



Orthogonal axis

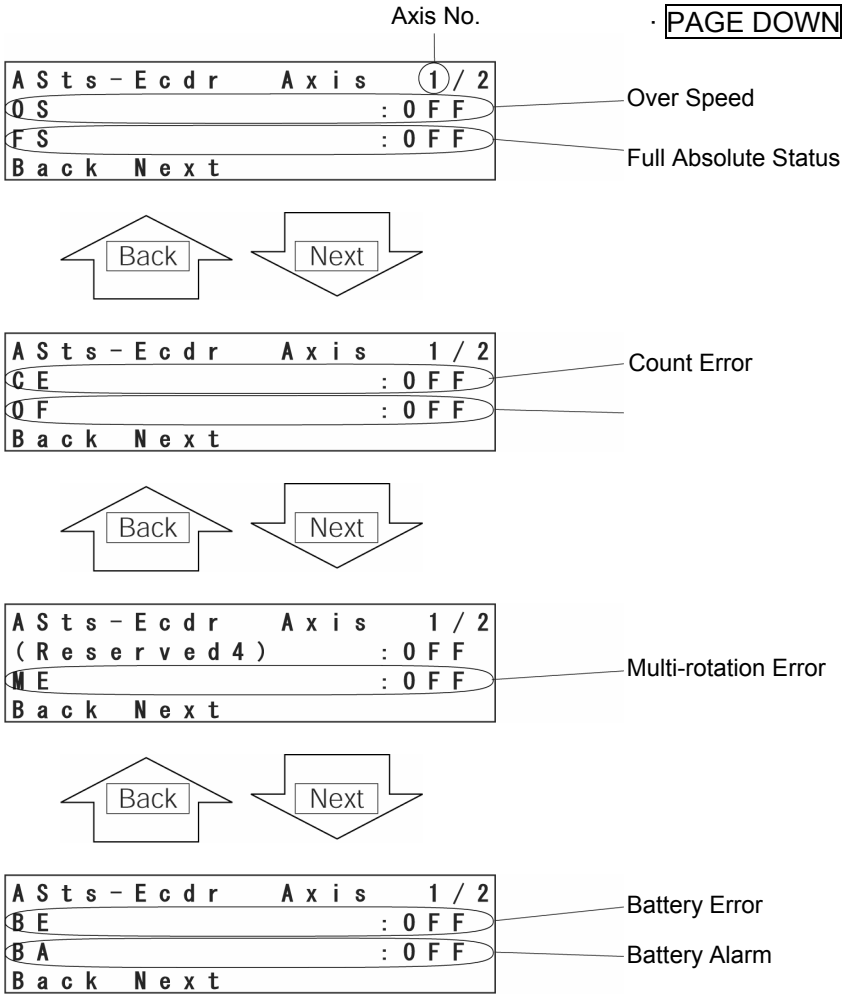


SCARA axis

(4) Encoder Status

Mode Transition: Moni — ASts — Ecdr

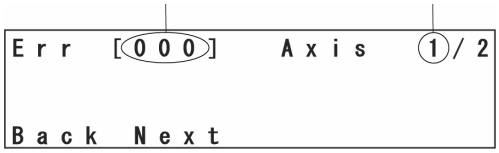
Axis No. can be switched with the PAGE UP · PAGE DOWN keys.



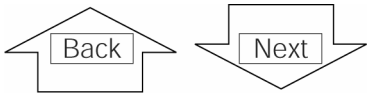
(5) Axis Related Error

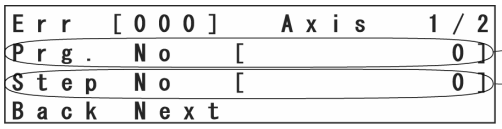
Mode Transition: Moni — ASts — ErrA

Error code Axis No.



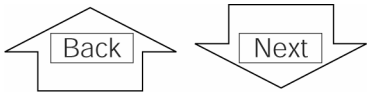
Axis No. can be switched with the PAGE UP · PAGE DOWN keys.

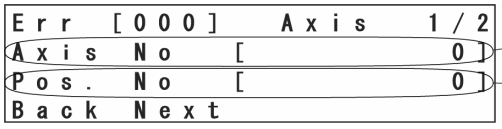




Program No.

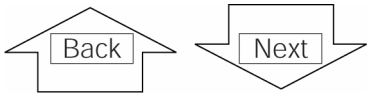
Step No.

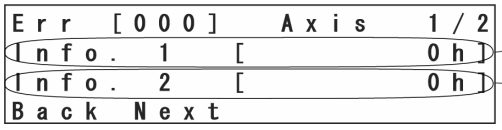




Axis No.

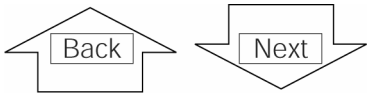
Position No.

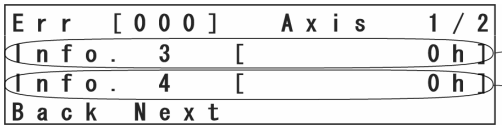




Information 1

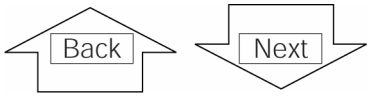
Information 2

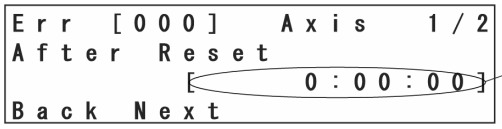




Information 3

Information 4

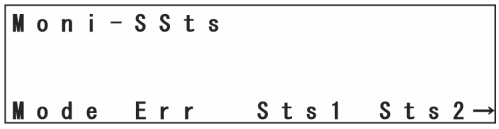




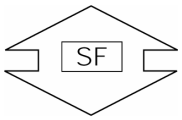
Time from the last software reset or power reconnection to error occurrence

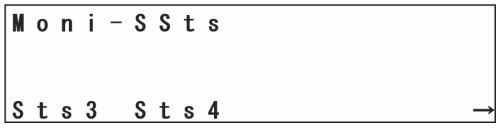
17-7. System Status

Display system status.
The status items may vary depending on the model.
Select the F2 (SSts) key on the monitor items screen.
Mode Transition: Moni — SSts



Mode: System Mode
Err: System Error
Sts1: System Status 1
Sts2: System Status 2





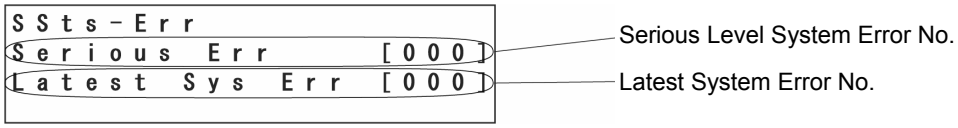
Sts3: System Status 3
Sts4: System Status 4

(1) System Mode

Mode Transition: Moni — SSts — Mode

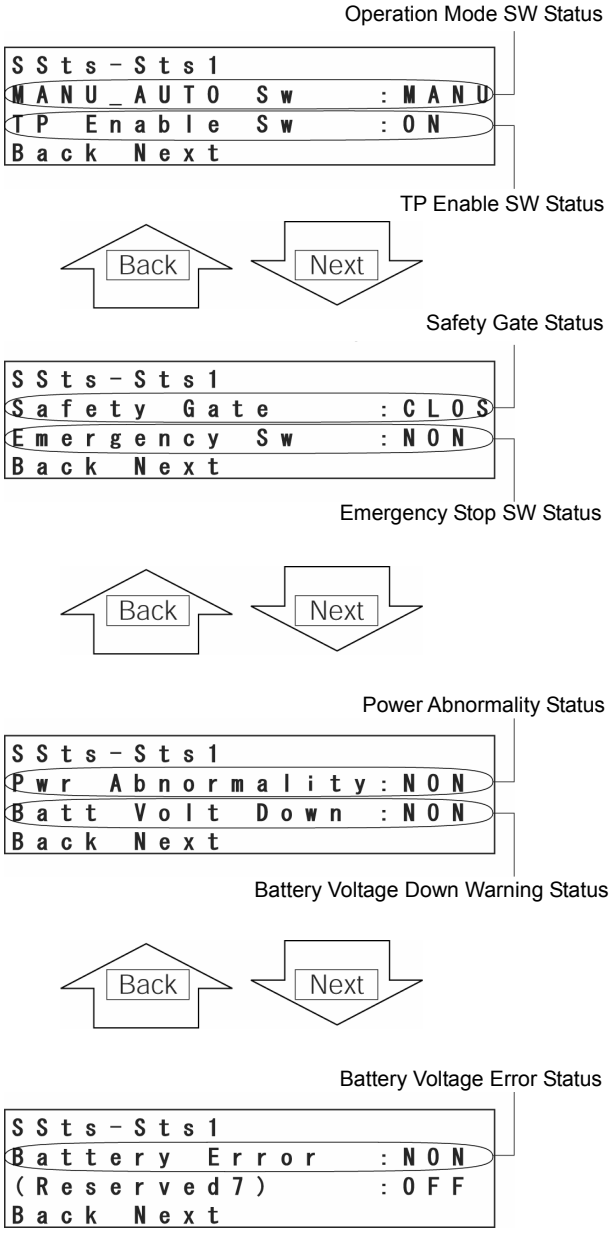
(2) System Error

Mode Transition: Moni — SSts — Err



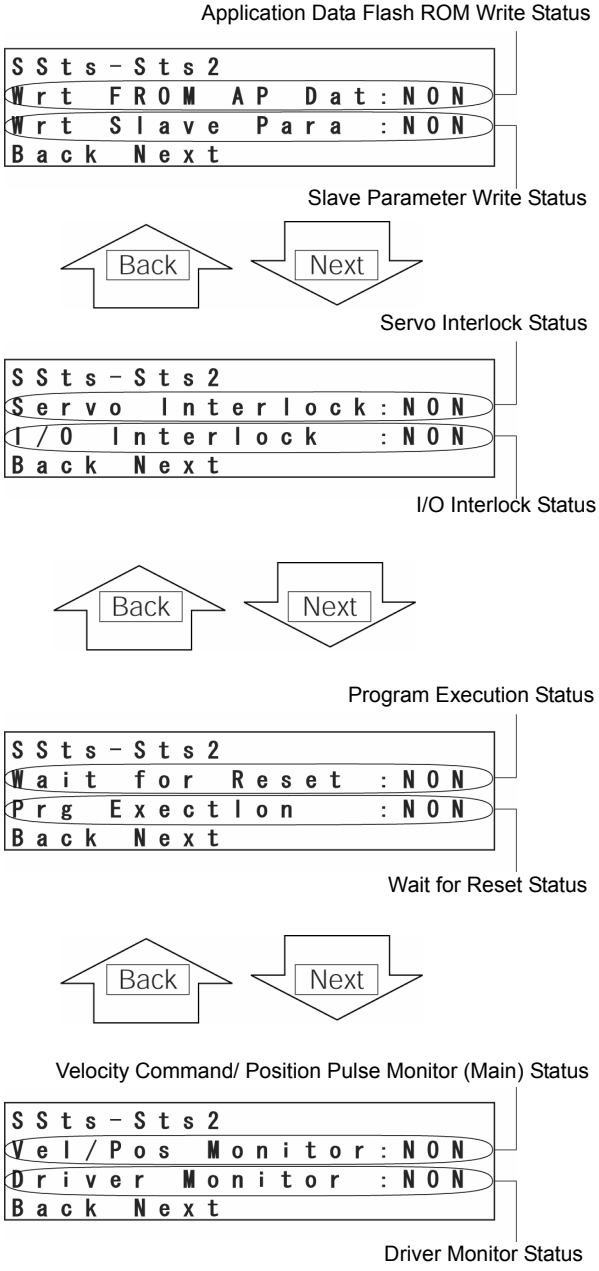
(3) System Status 1

Mode Transition: Moni — SSts — Sts1



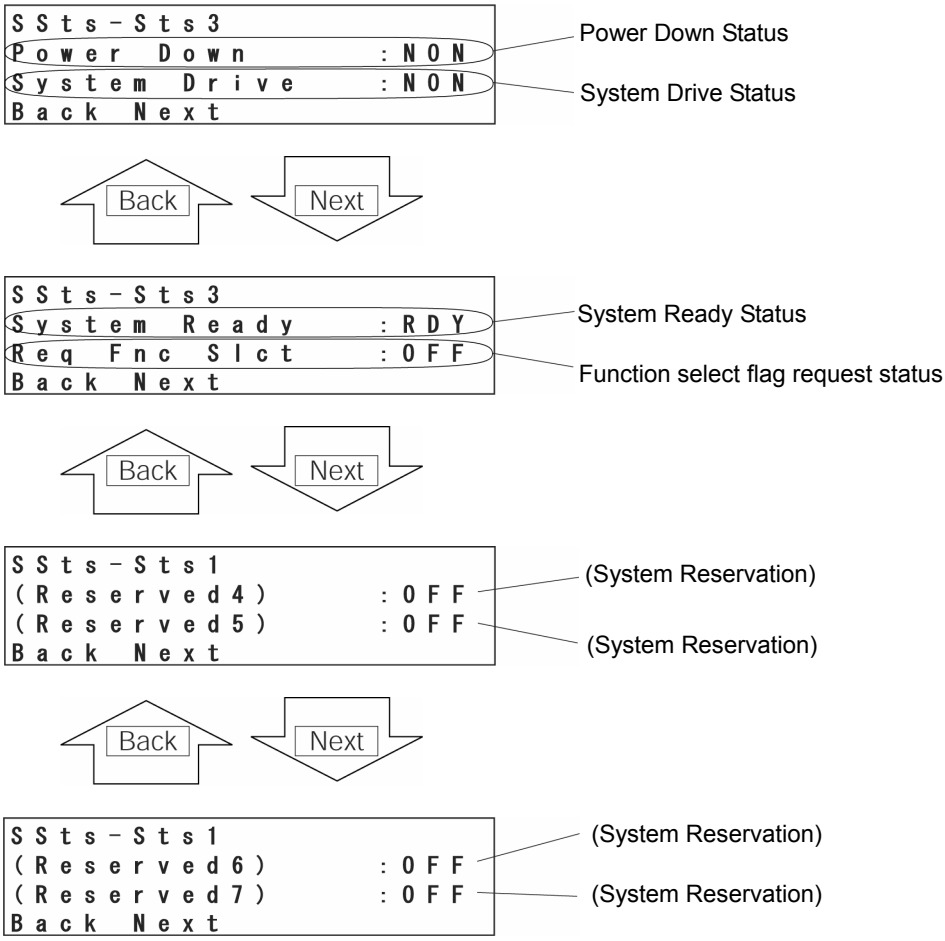
(4) System Status 2

Mode Transition: Moni — SSts — Sts2



(5) System Status 3

Mode Transition: Moni — SSts — Sts3



(6) System Status 4

Mode Transition: Moni — SSts — Sts4

System status 4 is all reserved. (System Reservation)

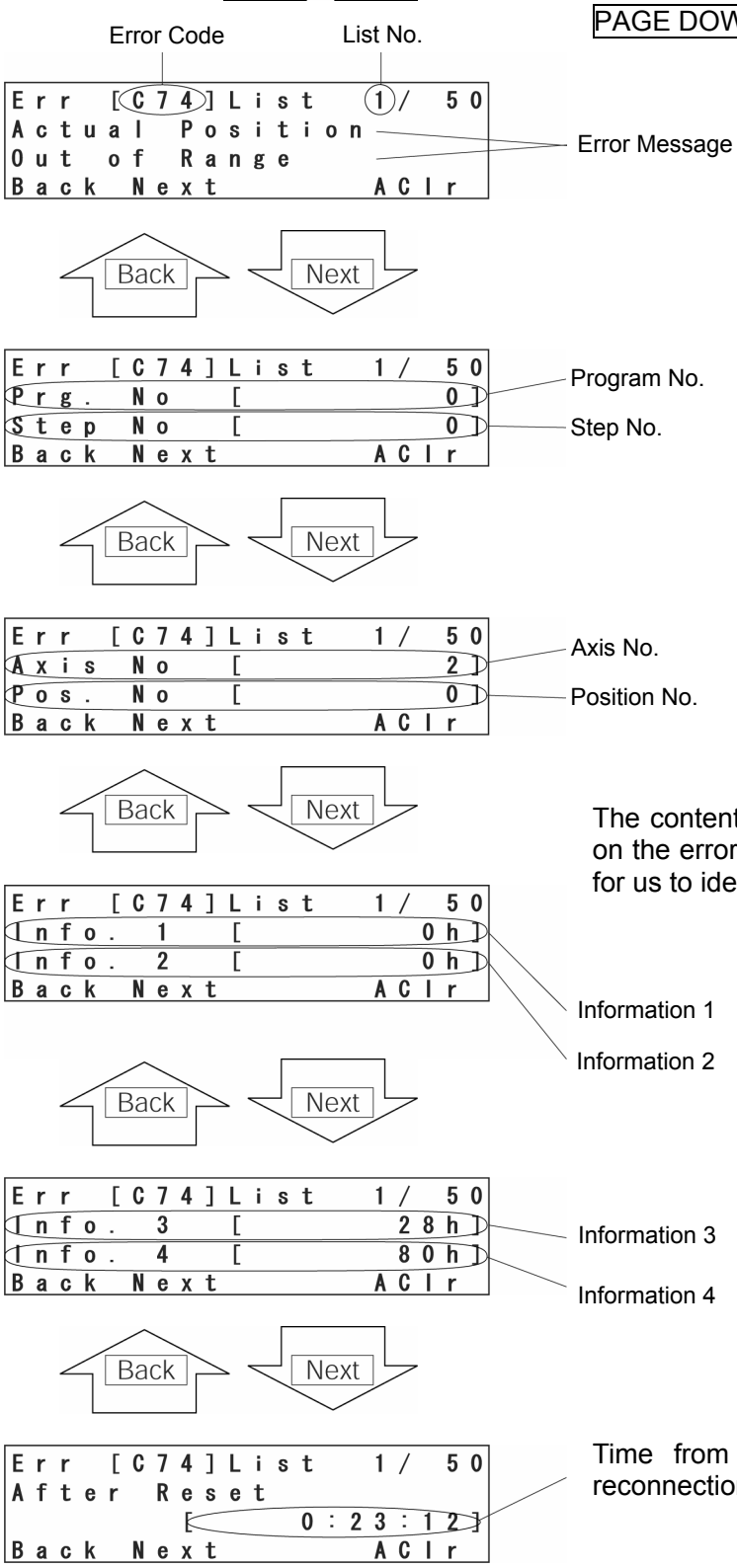
17-8. Error Detail Information

Displays the error detail information.

Select the F3 (ErrL) key on the monitor items screen.

Mode Transition: Moni — ErrL

List No. can be switched with the PAGE UP · PAGE DOWN keys.



The contents of Info. 1 to Info. 4 vary depending on the error codes. (Such information is intended for us to identify the cause of the error.)

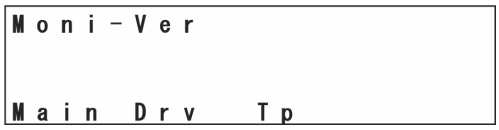
Time from the last software reset or power reconnection to error occurrence

17-9. Version Information

Displays version information.

Select the F4 (Ver) key on the monitor items screen.

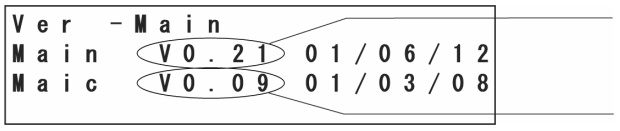
Mode Transition: Moni — Ver



Main: Main
Drv: Driver
TP: Teaching Pendant
SIO: Mount SIO
FPGA: FPGA
CTbl: Control Constant Table Management Information
Posi: Positioner Mode Management Information
Selectable items vary depending on the model.

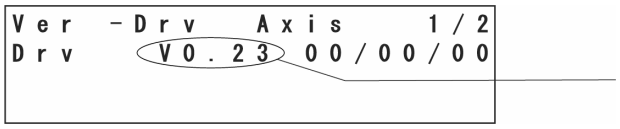
(1) Main

Mode Transition: Moni — Ver — Main



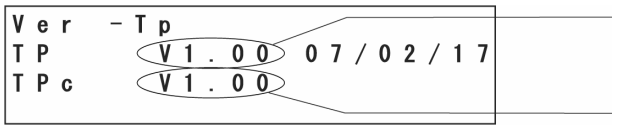
(2) Driver

Mode Transition: Moni — Ver — Drv



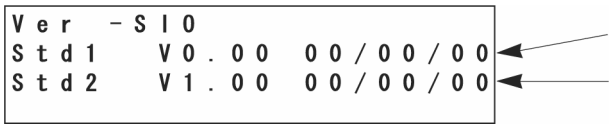
(3) Teaching Pendant

Mode Transition: Moni — Ver — TP



(4) Mount SIO (Controller P/Q and PX/QX type only)

Mode Transition: Moni — Ver — SIO



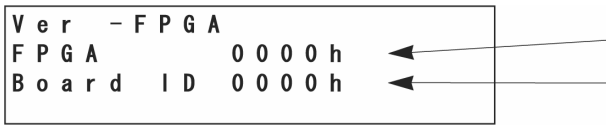
Channel 1 Version

Channel 2 Version

* "Nonuse" is displayed for the channel with the I/O parameters No. 201 and No. 213 set to "Nonuse."

(5) FPGA (Controller P/Q, PX/QX, SSEL, ASEL and PSEL type only)

Mode Transition: Moni — Ver — FPGA

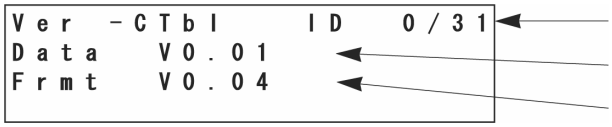


FPGA Version (HEX)

Board ID (HEX)

(6) Control Constant Table Management Information (Controller P/Q, PX/QX, SSEL, ASEL and PSEL type only)

Mode Transition: Moni — Ver — CTbl



Currently Displayed Table ID/Largest Table ID

Data Version

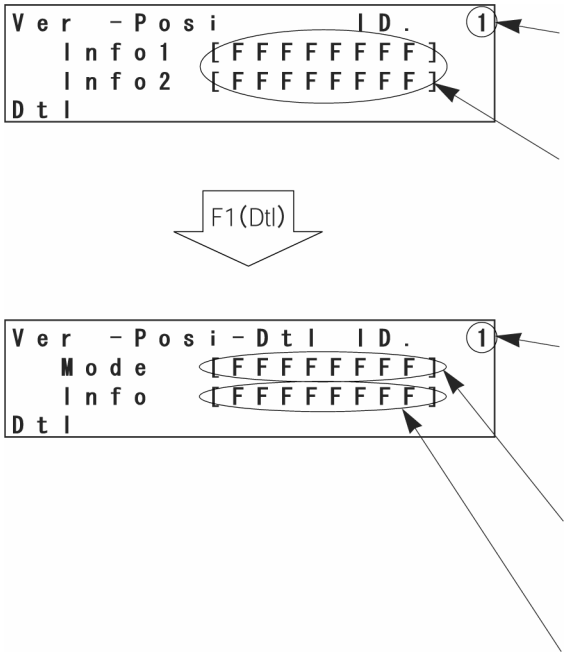
Format Version

* Change the table ID to display with the PAGE UP · PAGE DOWN keys.

(7) Positioner Mode Management Information for SSEL, ASEL or PSEL Controller in Positioner Mode

Mode Transition: Moni-Ver-Posi

*Only for the SSEL, ASEL and PSEL controllers in the positioner mode



ID
Displays the positioner mode ID specified by the current parameter ID.

Info 1, Info 2
Displays the system data management information in the positioner mode.

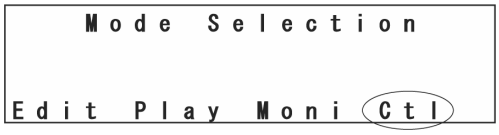
ID
Displays the positioner mode ID currently displayed.
The ID number is incremented with the Page Up key and decremented with the Page Down key.

Mode
Displays the operation mode of the positioner mode ID currently displayed.

Info
Displays the management information of the positioner mode ID currently displayed.

18. Controller

How to execute operation related to the controller such as a software reset and an error reset.



Select the F4 (Ctl) key on the mode selection screen.

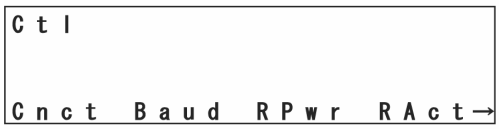
Controller operation items are displayed in the function key area.

18-1. Controller Items

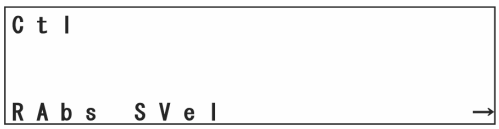
Each time by pressing the SF key, operation items will be shifted and displayed.

Selectable items may vary depending on the model.

Flsh: Flash ROM Writing
SRst: Software Reset
ERst: Error Reset
MClr: Memory Clear



Cnct: Re-Connection
Baud: Baud Rate Change
RPwr: Request Power Recovery
RAct: Request Action Pause Release

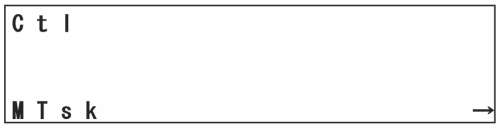


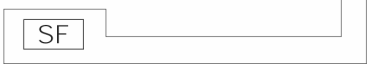
RAbs: Absolute Reset
SVel: Safety Velocity

Select the operation item with the function key.

MTsk: Selection of two or more programs start prohibition/permission

* X-SEL-P/Q main application Ver. 0.36 or later only
- X-SEL-PX/QX main application Ver. 0.17 or later
- SSEL, ASEL, PSEL Ver. 0.01 or later (only in the program mode)





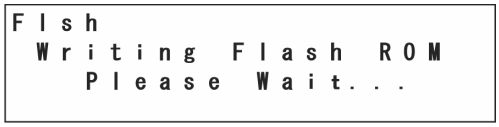
18-2. Flash ROM Writing

After clearing the data from Flash ROM, write data which is saved in controller memory to Flash ROM.

Select the F1(Flsh) key on the controller item screen.

Mode Transition: Ctl → Flsh

To write the data to Flash ROM, press the F1 (Yes) key.
If not, press the F2 (No) key. The screen returns to the controller item screen.



During Flash ROM writing, “Please Wait....” blinks.

*** Never shut off the power to the controller during Flash ROM writing.**

Return to the controller item screen with the ESC key.

18-3. Software Reset

Executes software reset of the controller. The data which is not written to Flash ROM will be cleared.

Select the F2 (SRst) key on the controller item screen.

Mode Transition: Ctl ─ SRst

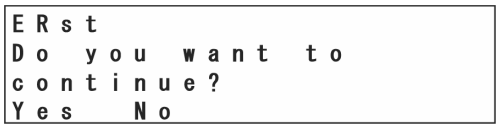
To execute a software reset, press the F1 (Yes) key. If not, press the F2 (No) key. The screen returns to the mode selection screen.

18-4. Error Reset

Executes error reset of the controller. Reset the message-level and action-release-level errors. If the cause of the error is not solved, the error will reoccur again.

Select the F3 (ERst) key on the controller item screen.

Mode Transition: Ctl ─ ERst



To execute an error reset, press the F1 (Yes) key.
If not, press the F2 (No) key.
The screen returns to the controller item screen.

18-5. Memory Clear

Zero clears the global variable.
Select the F4 (MClr) key on the controller item screen.
Mode Transition: Ctl → MClr

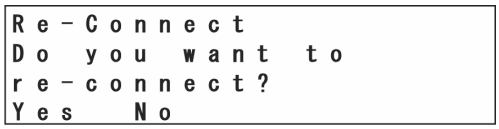
Press the F2 (Gvar) key.

To clear memory, press the F1 (Yes) key.
If not, press the F2 (No) key. The screen returns to the previous screen.

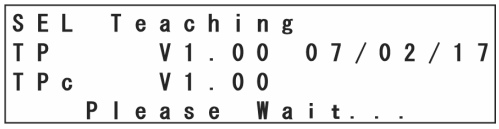
Returns to the previous screen with the ESC key.

18-6. Re-Connection

Re-connect to the controller. In a communicable state, the off-line mode can be moved to the on-line mode.
Select the F1 (Cnct) key on the controller item screen.
Mode Transition: Ctl → Cnct



To re-connect, press the F1 (Yes) key.
If not, press the F2 (No) key. It will return to the previous screen.

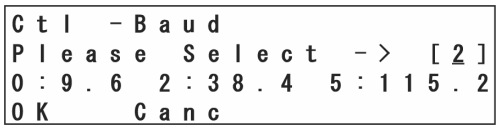


During re-connection, “Please wait...” blinks.

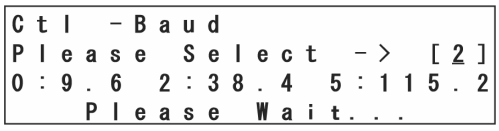
After a re-connection completes, it returns to the mode selection screen.

18-7. Baud Rate Change

Changes the communication baud rate between the controller and the teaching pendant.
Select the F2 (Baud) key on the controller item screen.
Mode Transition: Ctl → Baud



Input values corresponding to the baud rate by using the 10 keys and press the return key.
0: 9.6 2: 38.4 5: 115.2 [kbps]
To change the baud rate, press the F1 (OK) key.
To cancel, press F2 (Canc) key. It returns to the previous screen.

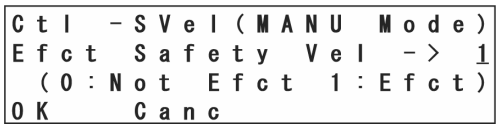


During baud rate change, “Please wait.... “ blinks.

Return to the baud rate change screen.

18-8. Safety Velocity

Switches the safety velocity limit status at manual mode.
Select the F2 (SVel) key on the controller item screen.
Mode Transition: Ctl → SVel

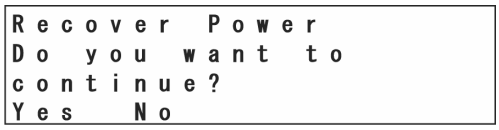


Input 1 or 0 by using the 10 keys and press the return key.
1: Safety Velocity Limit Effect
In the case of the orthogonal axis, the maximum velocity is under 250 mm/sec. The setting of the programs and parameters do not affect it. In the case of the SCARA axis, the maximum velocity is 250 mm/sec or lower for CP motion and 3% or less for PTP motion.
0: Safety Velocity Limit does not Effect

To switch the safety velocity limit status, press the F1 (OK) key.
To cancel, press the F2 (Canc) key.

18-9. Driver Power Recovery Request

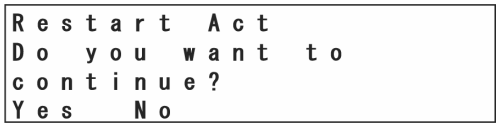
Requests to recover driver power to the controller.
Select the F3 (RPwrl) key on the controller item screen.
Mode Transition: Ctl ─ RPwr



To execute driver power recovery request, press the F1 (Yes) key. Return to the previous screen.
If not, press the F2 (No) key. Return to the previous screen.

18-10. Action Pause Release Request

Request to release action pause to the controller.
Select the F4 (RAct) key on the controller item screen.
Mode Transition: Ctl ─ RAct



To execute a action pause release request, press the F1 (Yes) key. Return to the previous screen.
If not, press the F2 (No) key. Return to the previous screen.

18-11. Driver Power Recovery Request (RPwr) and Action Pause Release Request (RAct)

18-11-1. In the case of Controller Other Than SSEL, ASEL and PSEL Controllers

(1) Driver Power Recovery Request

① Case which requires executing Driver Power Recovery Request
Only the following case requires executing Driver Power Recovery Request:
- When you set 1 in I/O parameter No. 44, Driver Power Cut-off cause occurs → Recovery after the main cause of cut-off is solved.

② How to execute Driver Power Recovery Request
Execute Driver Power Recovery Request by either of the following:
- Set 1 in I/O parameter No. 44 (Input Select Function 014 = Driver Power Cut-off Release Input) and ON edge input on input port No. 14.
- From the mode selection screen of the teaching pendant, select Ctl (Controller operation) → RPwr (Driver Power Recovery Request) and execute.

(2) Action Pause Release Request

① Case which requires Action Pause Release Request
Each of the following cases requires executing Action Pause Release Request:
- When you set 2 on other parameter No. 9 (Deadman SW recovery type = action continuation recovery [during automatic operation only]), stop according to deadman SW during automatic operation → recovery after releasing stop (action pause release).
- When you set 2 on other parameter No. 10 (emergency stop recovery type = action continuation recovery [during automatic operation only]), emergency stop during automatic operation → recovery after emergency stop release (action pause release).
- When you set 2 on other parameter No. 11 (safety gate OPEN time recovery type = action continuation recovery [during automatic operation only]), safety gate OPEN during automatic operation → recovery after safety gate CLOSE (action pause release).
- When you set 1 on I/O parameter No. 36 (input selection function 006 = pausing action signal), OFF level input on input port No. 6 during automatic operation (pausing action) → recovery after ON level input on input port No. 6 (action pause release).

② How to execute Action Pause Release Request
Execute Action Pause Release Request by any of the following:
- Set 1 in I/O parameter No. 35 (input selection function 005 = Action Pause Release Signal) and ON edge input on input port No. 5.
- From the software menu, execute Controller (C) → Action Pause Release Request (L).
- From the mode selection screen of the teaching pendant, select Ctl (Controller operation) → RAct (Action Pause Release Request) and execute.

* If case (1) ② and (2) ② occur at the same time, you need to first execute Driver Power Recovery Request. After completing it, execute the Action Pause Release Request.

18-11-2. In the case of SSEL, ASEL or PSEL Controller

(1) Driver Power Recovery Request

① Case which requires executing Driver Power Recovery Request

Only the following case requires executing Driver Power Recovery Request:

- When you specify any input port for the driver power cut-off release input signal (dedicated function), driver power cut-off occurs → recovery after the main cause of cut-off is solved.

② How to execute Driver Power Recovery Request

Execute Driver Power Recovery Request by any of the following:

- Set 17 (specified input function value) in the I/O parameter (No. 30 - No. 45, No. 251 - No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.)
  ON edge input on the specified input port No.
- From the software menu, execute Controller (C) → execute Driver Power Recovery Request (P).
- From the mode selection screen of the teaching pendant, select Ctl (Controller operation) → RPwr (Driver Power Recovery Request) and execute.

(2) Action Pause Release Request

① Case which requires Action Pause Release Request

Each of the following cases requires executing Action Pause Release Request:

- When you set 2 on other parameter No. 10 (emergency stop recovery type = action continuation recovery [during automatic operation only]), emergency stop during automatic operation → recovery after emergency stop release (action pause release).
- When you set 2 on other parameter No. 11 (deadman SW/enable SW recovery type = action continuation recovery [during automatic operation only]), stop according to deadman SW or enable SW during automatic operation → recovery after releasing stop (action pause release).
- Specify any input port for the action pause input signal (dedicated function). Set “8” (specified input function value) in the I/O parameter (No. 30 - No. 45, No. 251 - No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.)
  OFF level input in the input port No. specified during automatic operation (action pause) → recovery after ON level input on the input port No. (action pause release)

② How to execute Action Pause Release Request

Execute Action Pause Release Request by any of the following:

- Specify any input port for the action pause release signal (dedicated signal). Set “7” (specified input function value) in the I/O parameter (No. 30 - No. 45, No. 251 - No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.)
  ON edge input on the specified input port No.
- From the software menu, execute Controller (C) → Action Pause Release Request (L).
- From the mode selection screen of the teaching pendant, select Ctl (Controller operation) → RAct (Action Pause Release Request) and execute.

* If case (1) ① and (2) ① occur at the same time, you need to first execute Driver Power Recovery Request. After completing it, execute the Action Pause Release Request.

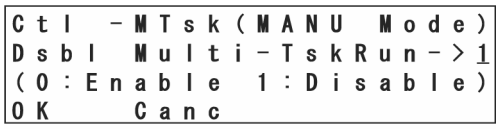
18-12. Selection of Two or More Programs Start Prohibition/Permission

Sets whether to permit or prohibit the simultaneous starting of multiple programs in the manual mode.
If prohibition is set, multiple programs will not be able to be started simultaneously. (Error no. 913 “Can’t start two or more programs” will occur.)
Select the F1 (MTsk) key on the controller screen.

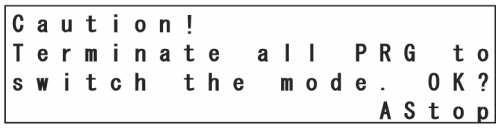
Mode Transition: Ctl—MTsk

*** This function is valid only for the following models:**

- X-SEL-P/Q (main application Ver. 0.36 or later)
- X-SEL-PX/QX (main application Ver. 0.17 or later)
- SSEL, ASEL, PSEL (main application Ver. 0.01 or later) (*only in the program mode)



To permit the simultaneous starting of multiple programs, press “0.” To prohibit it, press the [X] key. Then, press the F1 (OK) key.
To cancel the setting, press the F2 (Canc) key.



If the F1 (OK) key is pressed and executed on the previous screen, this screen will be displayed.
To execute the setting, press the F4 (AStp) key.
To cancel the setting, press the ESC key.

Note: To set prohibition, it is required to exit all the program execution.

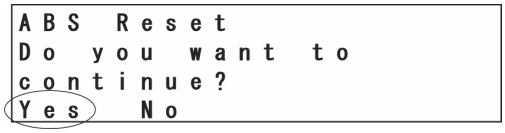
18-13. Absolute Reset

18-13-1. Absolute Reset of the orthogonal axis: X-SEL-K, P/Q, 5 axis and 6 axis of PX/QX, TT, SSEL, ASEL and PSEL controller

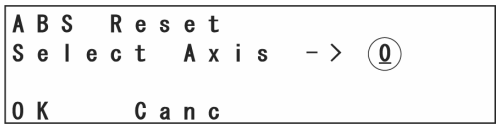
Executes absolute data reset.

Select the F1 (RAbs) key on the controller item screen.

Mode Transition: Ctl –RAbs



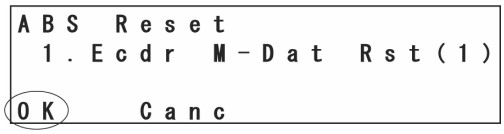
To execute absolute reset, press the F1 (Yes) key.
If not, press the F2 (No) key. Return to the previous screen.



Axis No. Input

Input the axis No. for executing absolute reset by using the 10 keys and press the return key.

To continue absolute reset, press the F1 (OK) key.
To cancel, press the F2 (Canc) key.
To cancel on screens ①~⑥ (see below), press the F2 (Canc) key.

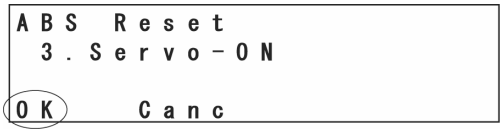


① Encoder multi-rotation data reset 1

Press the F1 (OK) key.

② Controller error reset

Press the F1 (OK) key.

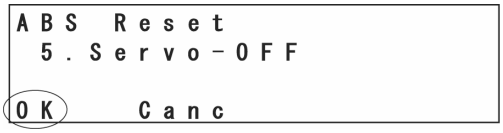


③ Servo ON

F1 (OK) key.

④ Homing

F1 (OK) key.



⑤ Servo OFF

After executing absolute reset, be sure to reset software or reconnect the power. Do not press the F1 (OK) key but press the PAGE UP key. Then move to "⑥ Encoder multi-rotation data reset 2."

⑥ Encoder multi-rotation data reset 2

Press the F1 (OK) key.

Return to the axis No. input screen.
To execute absolute reset on other axes, input axis No. here and press the F1 (OK) key. Repeat ①~⑥.
To finish absolute reset, press the ESC key.

Move to the software reset screen.
Press F1 (Yes) key to execute software reset.
After the software reset, return to the mode selection screen.

That's all for the absolute reset operation.

After executing absolute reset, be sure to reset software or reconnect the power.

18-13-2. Absolute Reset of the SCARA axis: X-SEL-K, P/Q, 5 axis and 6 axis of PX/QX, TT, SSEL, ASEL and PSEL controller

Absolute Reset Preparation

The following jigs are required to perform an absolute reset:

- Absolute Reset Adjustment jigs

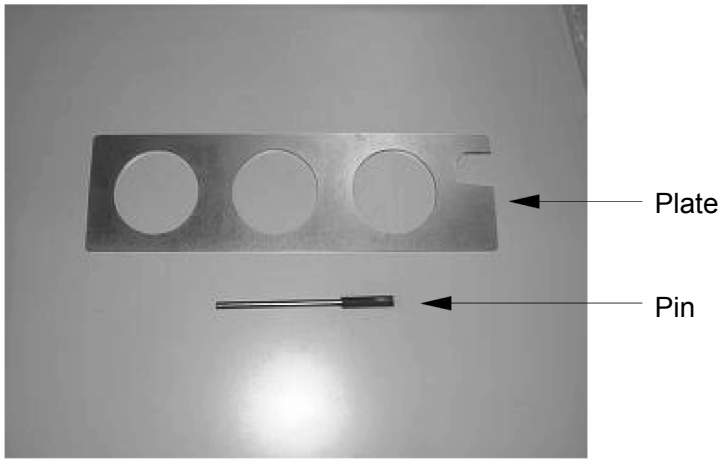
Type	Remarks
JG-1	Arm length 500/600
JG-2	Arm length 250/300/350
JG-3	Arm length 700/800
JG-4	Arm length 500/600 high-speed type
JG-5	Arm length 120/150/180

Connect the robot, controller and teaching pendant to make an operable status from the teaching pendant.

Always check operation of the EMG switch before performing work.

The absolute reset adjustment jig is always required to perform an absolute reset for the rotation axis and vertical axis, but not always required for arm 1 and arm 2.

(Rotation data can be reset as long as positioning accuracy of “center of positioning mark label ± 1 graduation” is ensured.)



Example of Absolute Reset Adjustment Jig (Type JG-1)

⚠ Warning

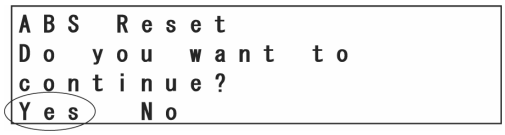
- Performing work without understanding inspection and maintenance work thoroughly may cause an accident resulting in injury or death.
- Post a sign “MEN WORKING” to prevent other workers from operating the controller, operation panel or other equipment.

An absolute reset is performed on the following 3 types: arm 1, arm 2 and Z-axis + R-axis.

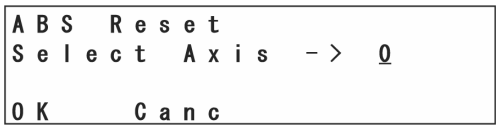
(1) Absolute reset on arm 1 and arm 2

Select the F1 (RAbs) key on the controller item screen.

Mode flow: Ctl – RAbs



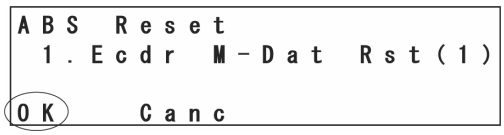
When performing an absolute reset, press the F1 (Yes) key.
When not performing an absolute reset, press the F2 (No) key. The display returns to the previous screen.



Axis No. input

Enter the axis No. for an absolute reset with the 10 key and press the return key.
Enter 1 to perform an absolute reset on the arm 1 or enter 2 on the arm 2.

When continuing an absolute reset, press the F1 (OK) key.
When canceling an absolute reset, press the F2 (Canc) key.
When canceling an absolute reset on any screen of the following ① through ⑥, press the F2 (Canc) key.



① Encoder multi-rotation data reset (1)

Press the F1 (OK) key.

② Controller error reset

Press the F1 (OK) key.

```
ABS Reset
 3.Servo-ON

OK     Canc
```

③ Servo ON

Press the F1 (OK) key.

```
ABS Reset
 4.Jog ->  Basic Pos.
           (Eye Mark)
OK     Canc       JVel
```

④ Jog movement

Jog the arm to the vicinity of the basic position (see the “Standard Posture Drawing” on the following page) and press the F1 (OK) key.

```
ABS Reset
 5.Servo-OFF

OK     Canc
```

⑤ Servo OFF

Press the F1 (OK) key.

```
ABS Reset
 6.EMG-ON  ->  Insert
   a positioning pin
OK     Canc
```

⑥ Emergency stop input and adjusting jig set

Press the EMERGENCY STOP button and set an adjusting jig.
After fixing the standard posture as shown on the next page, press the F1 (OK) key.

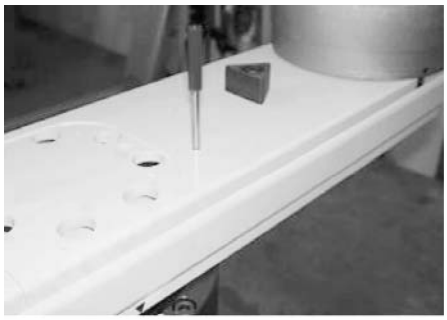
```
Msg [BE0]
Emergency Stop

Back  Next
```

Inputting emergency stop displays the screen at the left.
Pressing the ESC key returns the display to the previous screen.

Check that the EMERGENCY STOP button has been pressed.

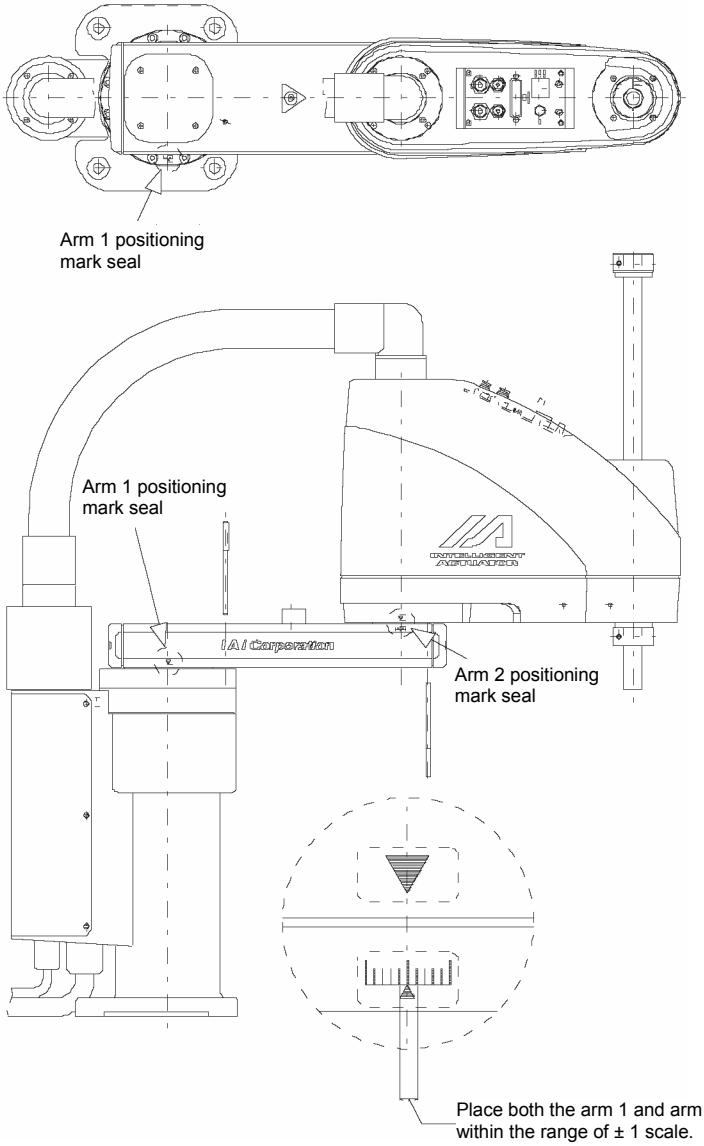
When performing an absolute reset for arm 1, set an adjustment jig (pin) in arm 1 to fix the arm at the reference position. In that case, arm 2 may be moved.
When performing an absolute reset for arm 2, set an adjustment jig (pin) in arm 2 to fix the arm at the reference position. In that case, arm 1 may be moved.

- After checking that the EMERGENCY STOP button has been pressed, set the jig.
- Decide the basic position referring to the positioning mark seal and set the jig.
- Only the arm 1 is covered with a lid with setscrews. Remove them and set the jig.
- An absolute reset on the arm with the adjusting jig is recommended. However, a multi-rotation reset is possible if the arm position is within the range of the mark seal ± 1 scale.



Arm 1
(Arm length 500/600, arm length 700/800

Arm 2
(Arm length 500/600, arm length 700/800)

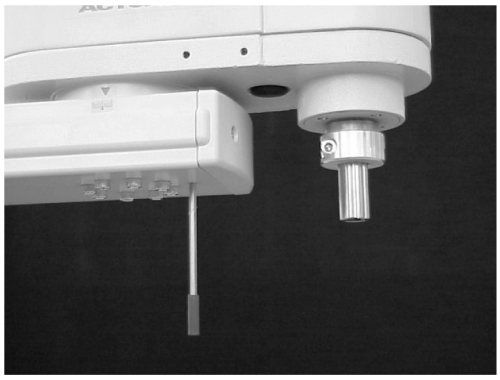


Arm length 500/600/700/800 Standard Posture Drawing

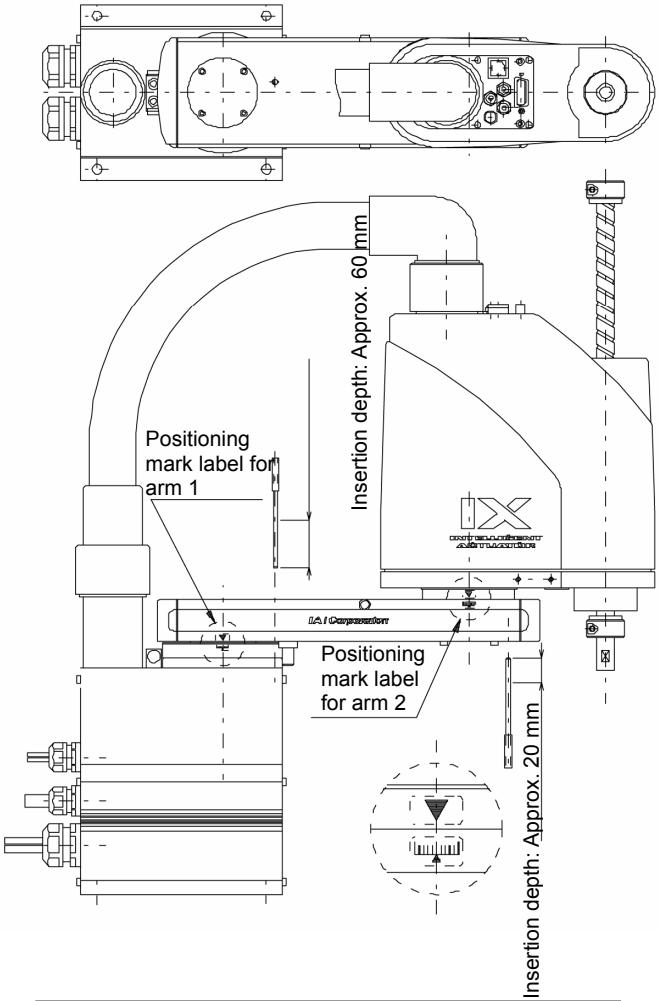
⚠ WARNING

- Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.

Arm 1
(Arm length 250/300/350)



Arm 2
(Arm length 250/300/350)

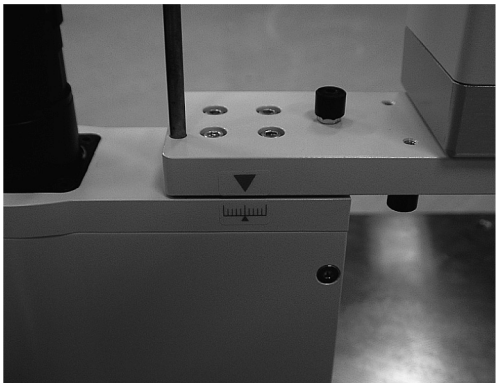


Arm length 250/300/350 Reference Position

(Note) When performing an absolute reset for arm 1 of IX-NNN2515, rotate arm 2 slightly then set with an adjustment jig (pin) to set it.

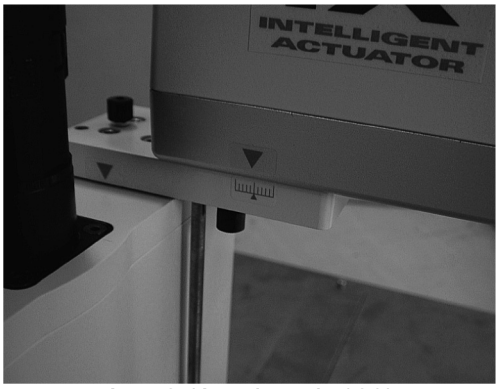
⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

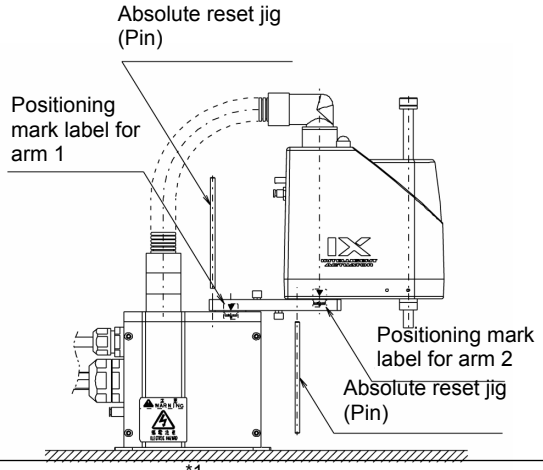


Arm 1 (Arm length 120/150/180)

Arm 2 (Arm length 150/180)

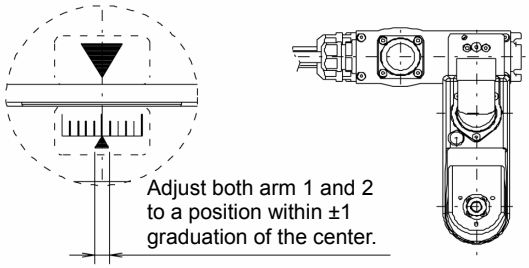


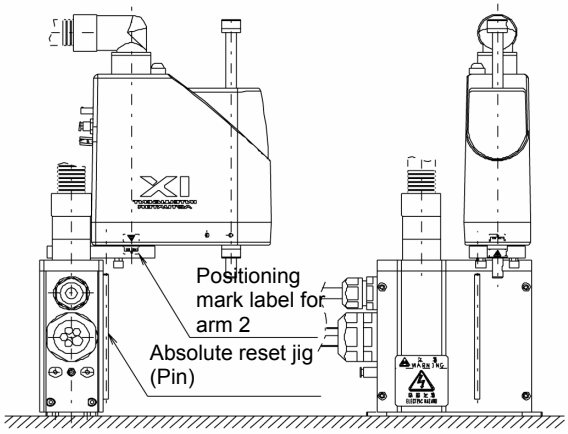
Arm 2 (Arm length 120)



Arm Length 120[*1]/150/180 Reference Position

*1: When an absolute reset is performed for arm 1 (arm length: 120)



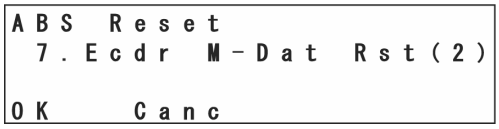


Arm Length 120[*2] Reference Position

*2: When an absolute reset is performed for arm 2 (arm length: 120)

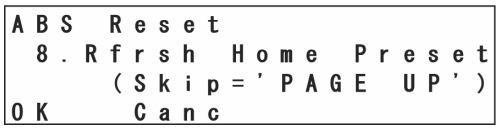
⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.



⑦ Encoder multi-rotation data reset

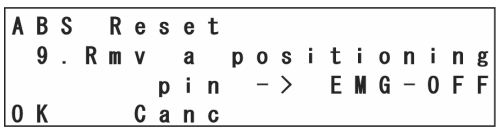
Press the F1 (OK) key.



⑧ Home preset value auto refresh

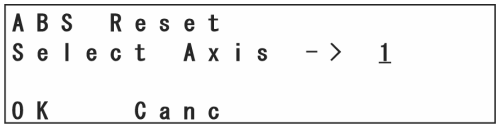
Press the PAGE UP key and do not press the F1 (OK) key.

- Do not execute the item of “Home preset value auto refresh.” (Be careful especially when performing an absolute reset without a jig.)
- If “home preset value auto refresh” is executed by mistake, perform absolute reset work without writing to Flash ROM. (The status will be the same as the one in which “home preset value auto refresh” is not executed.)



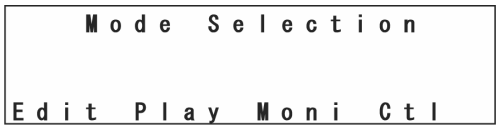
⑨ Remove the adjusting jig. Remove an emergency stop reset adjusting jig if it is set.

After resetting the EMERGENCY STOP button, press the F1 (OK) key.



Press the ESC key.

Restart the controller.
Press the F1 (Yes) key.



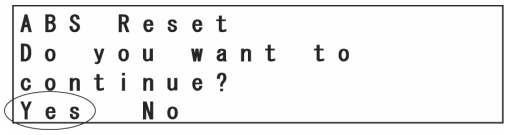
The screen returns to the Mode Selection screen.

NOTE: Be careful not to perform reset using an incorrect sequence, since it may cause the arm position to become offset.
Execute “home preset value auto refresh” only when any mechanical change such as arm change has been made. (Joint part only)

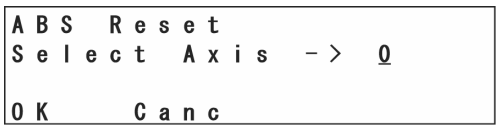
(2) Absolute reset on Z-axis + R-axis

Select the F1 (RAbs) key on the controller item screen.

Mode flow: Ctl – RAbs



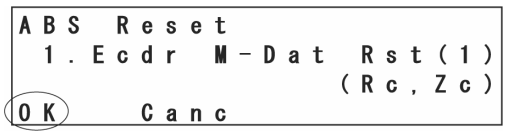
When performing an absolute reset, press the F1 (Yes) key.
When not performing an absolute reset, press the F2 (No) key. The display returns to the previous screen.



Axis No. input

Enter the axis No. for an absolute reset with the 10 key and press the return key.
Enter 3.

When continuing an absolute reset, press the F1 (OK) key.
When canceling an absolute reset, press the F2 (Canc) key.
When canceling an absolute reset on any screen of the following ① through ⑥, press the F2 (Canc) key.

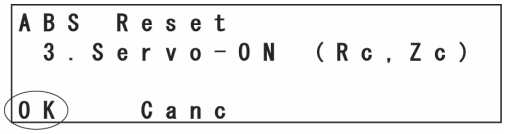


① Encoder multi-rotation data reset (1)

Press the F1 (OK) key.

② Controller error reset

Press the F1 (OK) key.



③ Servo ON

Press the F1 (OK) key.

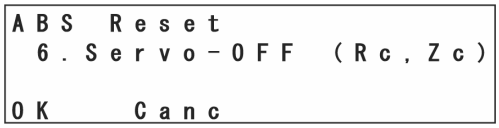
④ Temporary standard posture standby

Press the F1 (OK) key.

Note: The Z-axis returns to the home position.

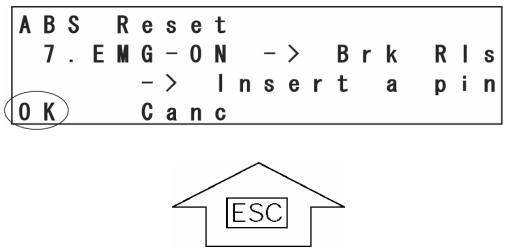
⑤ Jog movement

Move the R-axis to the vicinity of the basic position with jog keys (see the “Standard Posture Drawing” on the next page).
Press the F1 (OK) key.



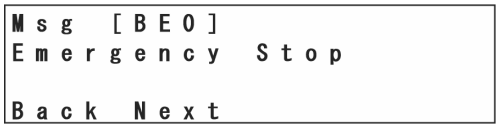
⑥ Servo OFF

Press the F1 (OK) key.



⑦ Emergency stop input and adjusting jig set

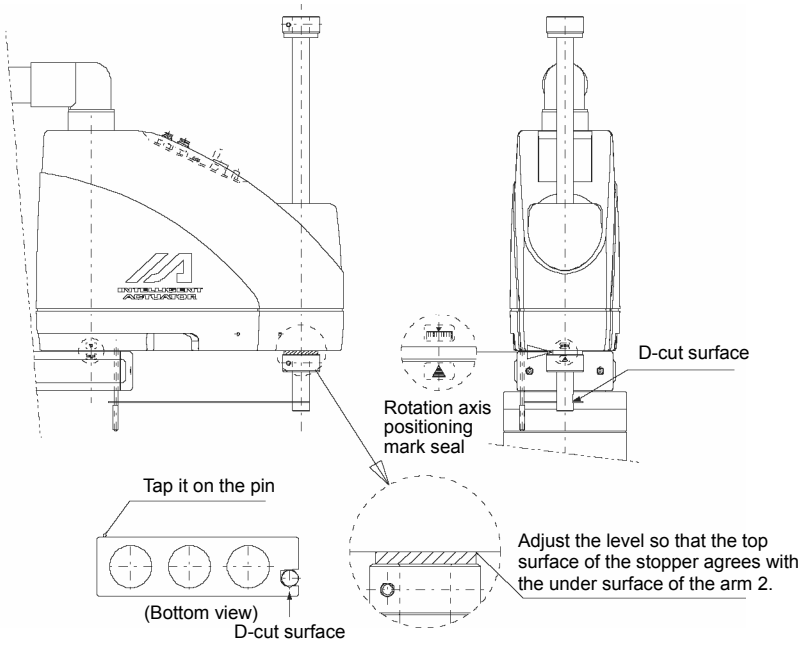
Press the EMERGENCY STOP button.
Press the brake release switch to release the brake.
After fixing the standard posture as shown below, press the F1 (OK) key.



Inputting emergency stop displays the screen at the left.
Pressing the ESC key returns the display to the previous screen.

Place the adjusting jig plate and pin as shown below and fix the standard posture.

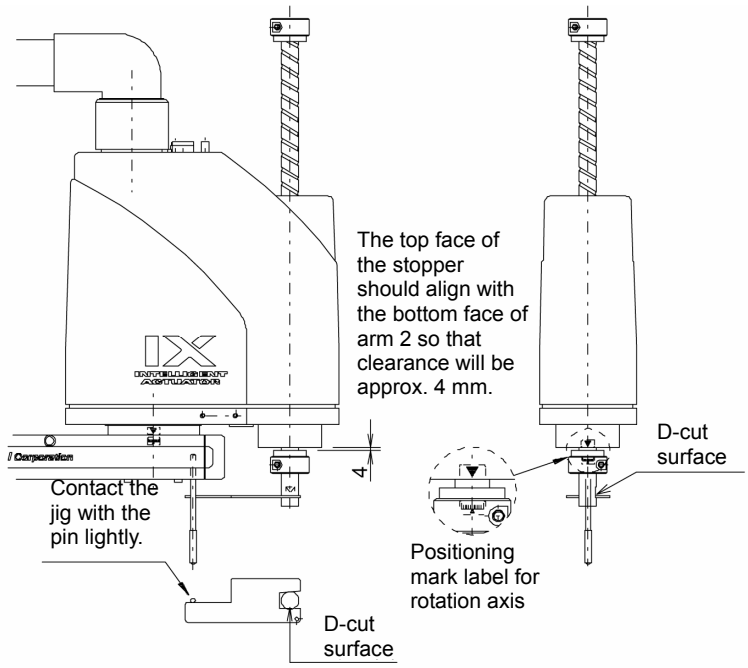
- After checking that the EMERGENCY STOP switch has been pressed, set the jig.
- Set the jig by referring to the positioning mark.
- Adjust the level so that the top surface of the stopper approximately agrees with the under surface of the arm 2.

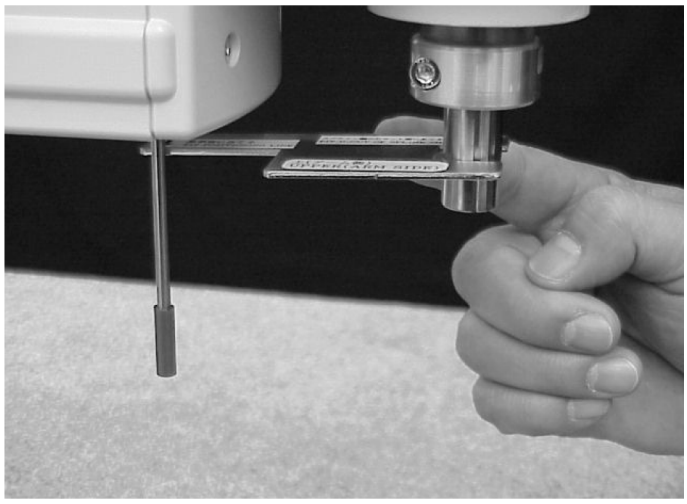


Arm length 500/600/700/800 Reference Position

⚠WARNING

- Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.

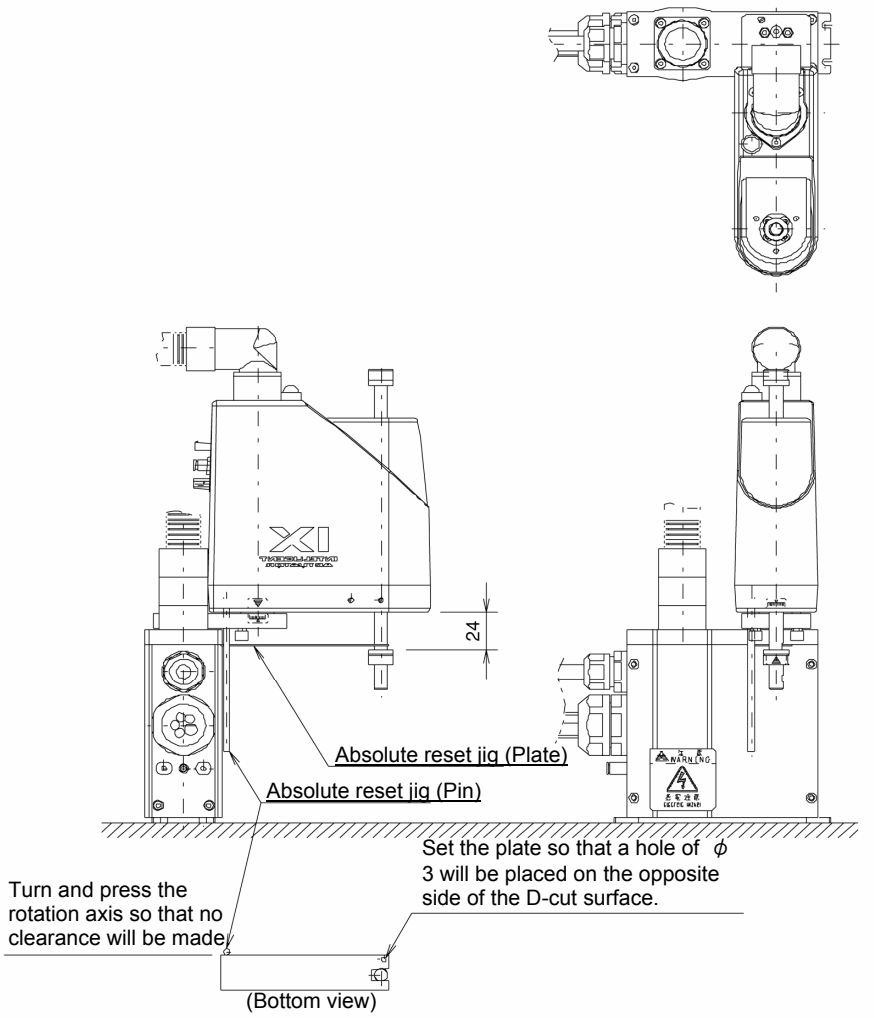




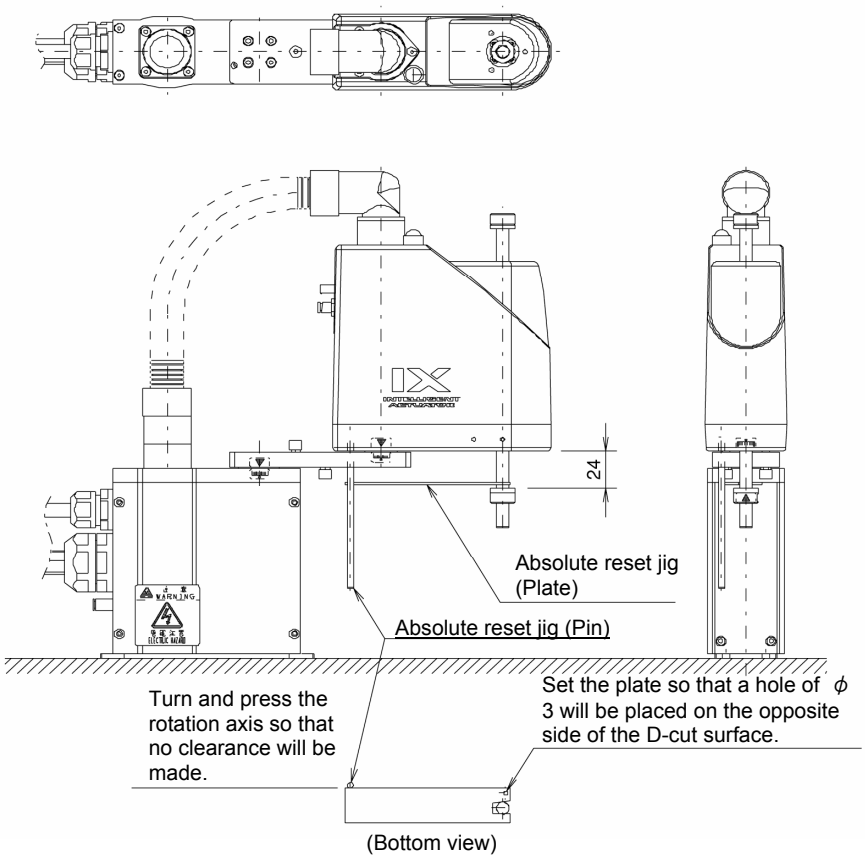
Arm Length 250/300/350 Reference Position

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.



Arm Length 120 Reference Position



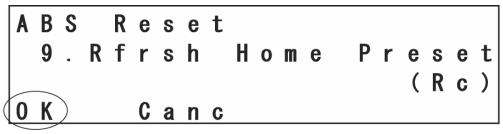
Arm Length 150/180 Reference Position

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.
- Pay attention to the orientation of the D-cut surface of the plate jig.

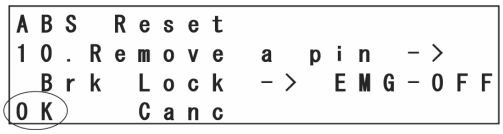
⑧ Encoder multi-rotation data reset (2)

Press the F1 (OK) key.



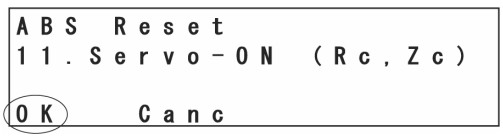
⑨ Home preset value auto refresh

Press the F1 (OK) key.



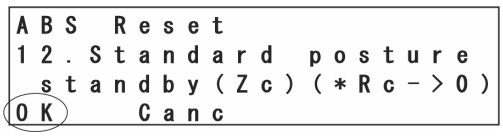
⑩ Adjusting jig removal and emergency off

Remove the adjusting jig.
Turn off the brake release switch to enable the brake.
Turn off the EMERGENCY STOP button.
Press the F1 (OK) key.



⑪ Servo ON

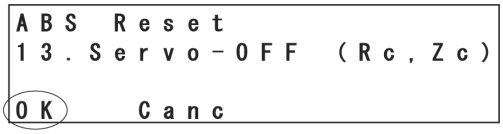
Press the F1 (OK) key.



⑫ Standard posture standby

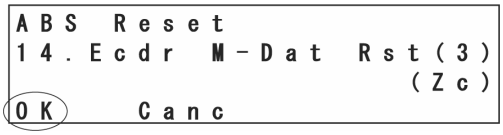
Press the F1 (OK) key.

Note: The Z-axis returns to the home position.



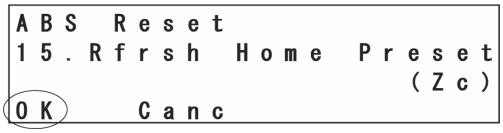
⑬ Servo OFF

Press the F1 (OK) key.



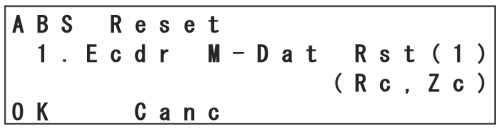
⑭ Encoder multi-rotation data reset (3)

Press the F1 (OK) key.

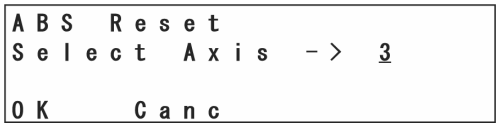


⑮ Home preset value auto refresh

Press the F1 (OK) key.

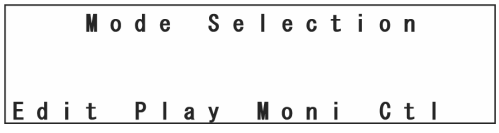


Return to the previous screen with the ESC key.



Note: If “Write Flash ROM?” is displayed, exit the screen with “No.”

Restart the controller.
Press the F1 (Yes) key.



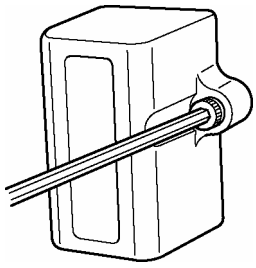
Writing Flash ROM

18-14. Procedures for Resetting Absolute-Battery Voltage-Down Warning Error for orthogonal axis : X-SEL-K, P/Q, 5 axis and 6axis of PX/QX, TT, SSEL, ASEL and PSEL controller

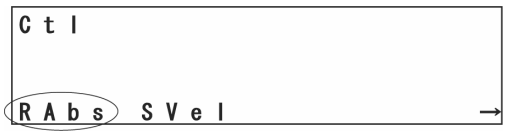
When the absolute-encoder-battery voltage-down warning error (error code A03) occurs or a battery with no error occurring is replaced, the encoder error and software are reset. Homing in the absolute reset procedures does not have to be attempted again.
Keep the controller's main power ON until the following procedures have been completed:

① Turn the servo OFF for all the axes for error resetting. (Use the SERVO, 1-, 2-, 3- and 4- keys on the teaching screen.)

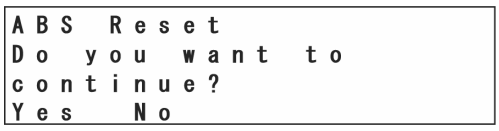
② Replace the batteries of the axes for error resetting.
When the voltage of absolute data holding batteries decreases, replace them together with the battery unit.



In the case of a controller other than X-SEL-P/Q, PX/QX, SSEL, ASEL and PSEL controllers, remove the bolt fixing the battery unit on the front panel with a hexagonal wrench, as shown in the diagram at the left.
Pull it out as it is toward you.
For the replacement of the batteries of X-SEL-P/Q, PX/QX, SSEL, ASEL and PSEL controllers, refer to the operating manual of each controller.

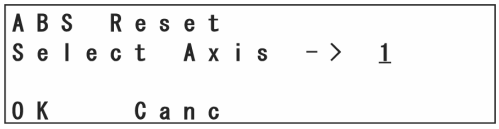


③ Select the F1 (RAbs) key from the controller items screen.

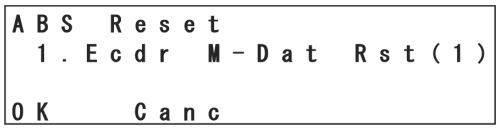


④ To reset the encoder error, press the F1 (Yes) key.
If not, press the F2 (No) key. Return to the previous screen.

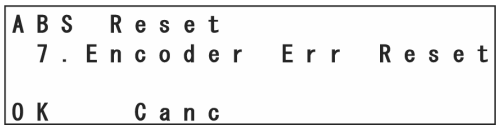
⑤ Axis No. Input
Input the axis No. for an encoder error reset with the 10 keys and press the return key.



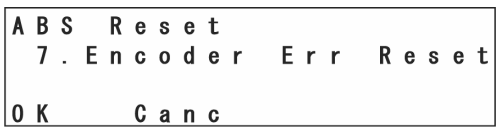
⑥ To continue the encoder error reset, press the F1 (OK) key.
To cancel the encoder error reset, press the F2 (Canc) key.



⑦ Press the PAGE UP/PAGE DOWN key several times to display “7. Encoder Err Reset” screen.



⑧ To reset the encoder error, press the F1 (OK) key. (To cancel the encoder error reset, press the F2 (Canc) key.)
Even if the F1 (OK) key is pressed, the screen will not change.



⑨ When also resetting the encoder error reset for another axis, press the F2 (Canc) key. Return to the screen of ⑥. Input the axis No. with the 10 keys and press the return key.
To complete the encoder error reset, press the ESC key.

⑩ Reset software.
Display “SRst” in the function key area with the SF key.
Press the F2 (SRst) key.
For the following operations, refer to “18-3. Software Reset.”

* Supplement

Orthogonal Axis Synchro Specification Absolute Reset : X-SEL-K, P/Q, 5 axis and 6 axis of PX/QX, TT, SSEL, ASEL and PSEL controller

The following are descriptions about the absolute reset methods for synchro specification axes.
The products ordered as the synchro specification are shipped after setting parameters to the synchro specification. However, change the parameters when executing an absolute reset.

1. Synchro Axes

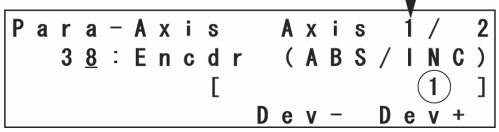
Synchro axes are comprised of the master axis (main axis) and the slave axis (sub-axis). The axis of which the number is smaller becomes the master axis.
Program commands are valid only for the master axis. (Commands to the slave axis are prohibited.)
As the absolute reset methods, there is the standard procedure and the special procedure. Which procedure to be used is determined by the “each-axis parameter No. 38 encoder ABS/INC type” values for the master and slave axes.

“Each-Axis Parameter No. 38 Encoder ABS/INC Type” Values		Absolute Reset Methods
Master Axis	Slave Axis	
1	1	Special procedure
1	0	Standard procedure
0	0	

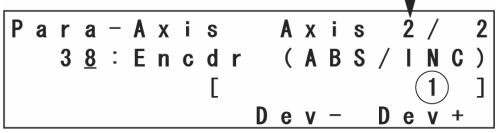
(When the value is 0 for both the master axis and the slave axis, both the axes are of the increment specification.)

Example 1) When special procedure is executed for 2-axis controller:
Mode Transition: Edit → Para → Axis

Master axis with a smaller axis No.

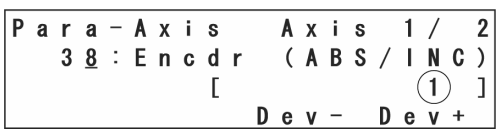


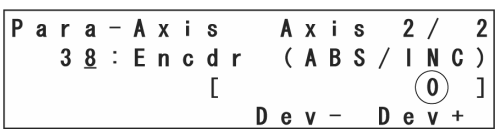
Slave axis



Note: To change the axis No., use the F3 (Dev-) key or F4 (Dev+) key.

Example 2) When standard procedure is executed for 2-axis controller:





2. Location Adjustment of Synchro Axes Sliders

Align the synchro axes sliders. (Physical parallel adjustment)

(1) Adjust the relative locations between the sliders of the master and slave axes and connect them while the axes are not connected to the controller via cables (controller main power OFF).

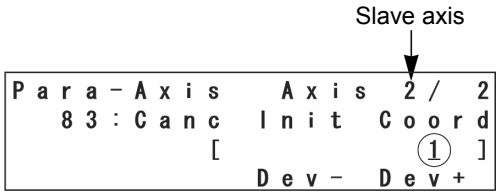
(2) If location adjustment cannot be made while the axes are not connected to the controller via cables (such as with the brake), follow the steps below.
   ① Disconnect the sliders temporarily and connect the axes to the controller via cables.
   ② Record the current values of the “each-axis parameter No. 65 synchro other axis No.” for the master and slave axes. (Record them to return to their original values in a later process.)
   ③ To cancel the synchro function temporarily, input 0 to the “each-axis parameter No. 65 synchro other axis No.” for both the master and slave axes, and execute the data transfer to the controller, Flash ROM writing and controller restart (software reset) in this order.
   ④ Execute an absolute reset (standard procedure) for each of the master and slave axes as a single axis.
   ⑤ Adjust the relative locations of the sliders by jog operation, etc., and connect them.
   ⑥ To activate the synchro function again, input the values recorded in ② above to the “each-axis parameter No. 65 synchro other axis No.” for the master and slave axes, and execute the data transfer to the controller, Flash ROM writing and controller restart (software reset) in this order.

3. Special Procedure Absolute Reset

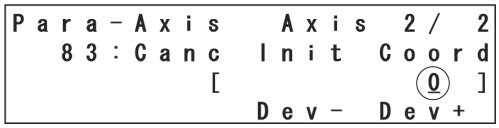
In the case of “each-axis parameter No. 38 encoder ABS/INC type”: master axis = 1 and slave axis = 1:

(1) Record the current value of the “each-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” for the slave axis. (Record it to return to the original value in a later process.)

Mode Transition: Edit → Para → Axis



(2) Input 0 for the “each-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” for the slave axis.



Input 0 with the 10 keys and press the return key.

Press the ESC key several times to move to the Flash ROM writing screen.

Write the data to Flash ROM.
Press the F1 (Yes) key.

Execute restart (software reset).
Press the F1 (Yes) key.

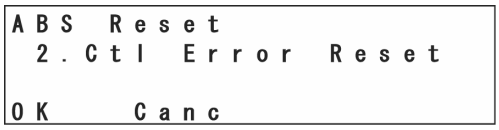
(3) Execute an absolute reset according to the following special procedure (forced operation by ignoring the screen steps):

Mode Transition: Ctl → RAbs

① Execute the “encoder multi-rotation data reset 1“ for the slave axis.

Input the axis No. of the slave axis and press the return key.
Press the F1 (OK) key.

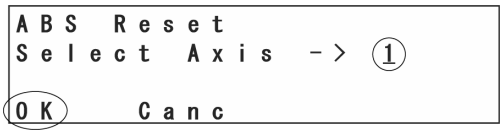
Press the F1 (OK) key.



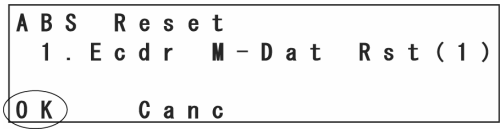
Exit from the absolute reset mode temporarily with the ESC key, without pressing the F1 (OK) key.

Press the F1 (RAbs) key to return to the absolute reset mode.

② Execute an absolute reset for the master axis according to the screen steps.



Input the axis No. of the mater axis and press the return key.
Press the F1 (OK) key.

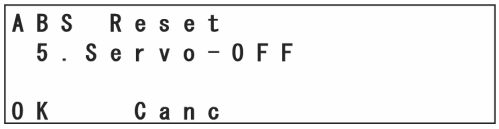


Press the F1 (OK) key.

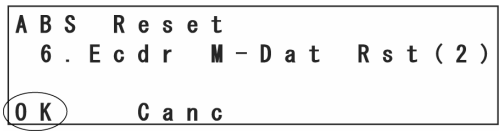
Press the F1 (OK) key.

Press the F1 (OK) key.

Execute homing.
Press the F1 (OK) key.



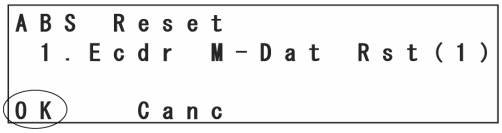
Press the PAGE UP key to advance the screen, without pressing the F1 (OK) key.



Press the F1 (OK) key.

③ Execute the “encoder multi-rotation data reset 1” for the slave axis again.

Input the axis No. of the slave axis again and press the return key.
Press the F1 (OK) key.



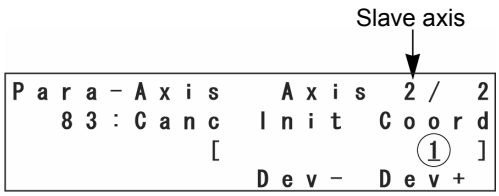
Press the F1 (OK) key.

Exit from the absolute reset mode with the ESC key, without pressing the F1 (OK) key.

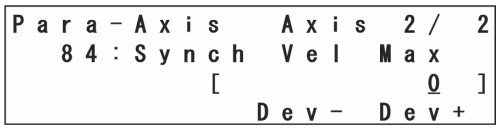
Restart the controller.
Press the F1 (Yes) key.

Return the slave-axis value for the “each-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” to the original value.

Mode Transition: Edit → Para → Axis



Press the WRT key to transfer the data.



Advance to the next parameter screen. Move to the Flash ROM writing screen with the ESC key.

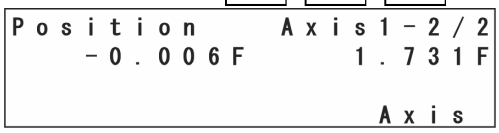
Write the data to Flash ROM.
Press the F1 (Yes) key.

Restart the controller.
Press the F1 (Yes) key.

(5) Set the preset home value to uniform the coordinate values of the master and slave axes.

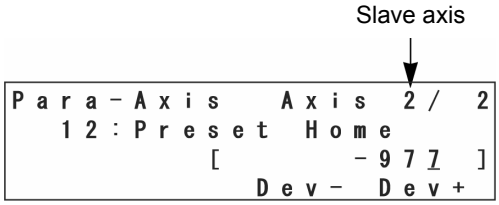
① If the controller 7 segment display is “rdy” while the servo is OFF, read the displayed current positions of the master and slave axes.
(If the error No. C74 real position soft limit over error occurs, reset the error. When “rdy” is displayed, the displayed current positions can be read.)

Mode Transition: Moni—ASts—Posi



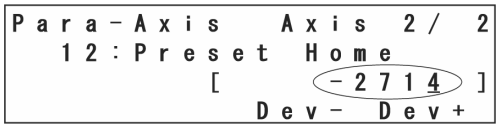
* If the servo is turned ON at this stage, error No. D0A driver overload error, error No. C6B deviation overflow error, error No. CA5 stop deviation overflow error, etc., occurs.

② Calculate the following:
Each-axis parameter No. 12 preset home value for slave axis [0.001 mm]
+ ((displayed current position value for master axis [mm] - displayed current position value for slave axis [mm]) × 1000)



In this example:
-977 + ((-0.006-1.731) × 1000)) = -2714

③ Input the calculation result in ② above to the “each-axis parameter No. 12 preset home value” for the slave axis.



After pressing the return key, press the WRT key to transfer the data.
Move to the Flash ROM writing screen with the ESC key.

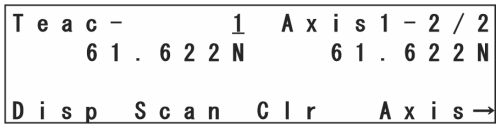
Write the data to Flash ROM.
Press the F1 (Yes) key.

Restart the controller.
Press the F1 (Yes) key.

(7) Display the current positions on the teaching screen.

After turning the servo ON, execute action check by jogging. (Master axis operation)

Mode Transition: Edit → Poji → Teac



To switch the current position screen to the input data screen, press the F3 (Disp) key.
To turn the servo ON/OFF, use the SERVO, 1-, 1+, 2-, 2+, 3-, 3+, 4- and 4+ keys.

If the error No. D0A driver overload error, error No. C6B deviation overflow error, error No. CA5 stop deviation overflow error, etc., occurs, check the following items:

- If the current position of the master axis is greatly different from that of the slave axis, setting in (5) may be wrong.
- Confirm that there are no input errors or change omissions as for the parameters below.
  “Each-axis parameter No. 65 synchro other axis No.”
  “Each-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel”
- Confirm that slider actions are not restrained.

4. Standard Procedure Absolute Reset

In the case of “each-axis parameter No. 38 encoder ABS/INC type:” master axis = 1 and slave axis = 0:
After “2. Location Adjustment of Synchro Axes Sliders,” execute a normal absolute reset only for the master axis.
For the operating method, refer to the Teaching Pendant Instruction Manual.

Note: The synchro axis for which the standard procedure absolute reset has been executed does not have the function of correcting the slider displacement during power OFF after the servo is turned ON.

◎ About Error Level Management

Error level	Origin of System Error Assignment	Error No. (HEX)	Indication (7SEG, DISPLAY, etc.)	Error list	Error LED output	Program operation		Error reset	Note
						Other parameter No. 4 = 0	Other parameter No. 4 = 1		
Secret level	MAIN Application	800 - 88F		○					Special maintenance error level
	MAIN Core	890 - 8AF							
	PC	8B0 - 8DF							
	TP	8E0 - 8FF							
Message level	MAIN Application	900 - 93F	○	△ (Battery-related and field-bus-related errors are registered in the error list.)				Yes	Indicates Status, Input Error, etc.
	MAIN Core	940 - 97F							
	PC	980 - 9AF							
	PC (Update tool)	9B0 - 9BF							
	TP	9C0 - 9FF							
	Flash ACK Time Out	A00 - A6F							
	MAIN Core	A70 - A9F							
	PC	AA0 - ACF							
	TP	AD0 - AFF							
Action Release level	MAIN Application	B00 - B9F	○	○		Release the program at the source. (Errors other than axis-related errors become release factors only in an error-occurring moment.)	Release all the programs except for the “I/O processing program at action-abort time.” (Errors other than axis-related errors become release factors only in an error-occurring moment.)	Yes	Errors interfering with action. For any minor errors with a level lower than this, error release is attempted with the auto-reset function at the external active command (SIO/PIO) receipt.
	MAIN Core	BA0 - BBF							
	PC	BC0 - BDF							
	TP	BE0 - BFF							
	MAIN Application	C00 - CCF							
	MAIN Core	CD0 - CDF							
	PC	CE0 - CEF							
	TP	CF0 - CFF							
Cold start level	MAIN Application	D00 - D8F	○	○		Release the program at the source. * However, release all the programs except for the “I/O processing program at action-abort time” when driving-power-down requiring errors (initialization error, power error, etc.) occur.	Release all the programs except for the “I/O processing program at action-abort time.”	No	Need to turn ON power again. (CPU and OS will operate normally.)
	MAIN Core	D90 - DAF							
	PC	DB0 - DCF							
	PC (Update tool)	DD0 - DDF							
	TP	DE0 - DFF							
	MAIN Application	E00 - E8F							
	MAIN Core	E90 - EBF							
	PC	EC0 - EDF							
	TP	EE0 - EFF							
System failure level	MAIN Application	FF0 - FBF	○	○	○	All release		No	Need to turn ON power. (CPU and OS will not operate.)
	MAIN Core	FC0 - FCF							
	PC	FD0 - FDF							
	TP	FE0 - FEF							

TP: Teaching Pendant, PC: PC software

X-SEL Teaching Pendant Error List (Application Part)

(It is an error peculiar to a Teaching Pendant. Refer to the instruction manual of X-SEL controller for the error of a controller.)

Error No.	Error message	The explanation, solution, etc.
9C0	Input data error	Input data error. Check the input data.
9C1	Input data too small	Too-small input data. Check the allowable input range.
9C2	Input data too large	Too-large input data. Check the allowable input range.
9C3	SEL Cmnd Input Error	SEL command input error. Invalid data is input for the SEL command.
9C4	Inputting Conditions are not allowed	Input-condition input prohibition error. The input condition is used in the step where use of such condition is not allowed.
9C5	Input Condition Data Error	Input condition data error. An invalid value is input for the input condition.
9C6	Input Condition is out of range	Input condition out-of-range error. A value out of the input range is input for the input condition.
9C7	No Input Condition yet	Input-condition no input error. No input condition is input in the step where such condition is essential.
9C8	Undefined Symbol (Input Condition)	Undefined symbol (input condition) use error. An undefined symbol is used for the input condition.
9C9	Operand not inputted (Oprnd1)	Operand 1 no input error. The operand 1 is not input in the step where the operand 1 is essential.
9CA	Operand not inputted (Oprnd2)	Operand 2 no input error. The operand 2 is not input in the step where the operand 2 is essential.
9CB	Operand not inputted (Oprnd3)	Operand 3 no input error. The operand 3 is not input in the step where the operand 3 is essential.
9CC	Inputting Oprnd is not allowed (Oprnd1)	Operand 1 input prohibition error. The operand 1 is used in the step where use of the operand 1 is prohibited.
9CD	Inputting Oprnd is not allowed (Oprnd2)	Operand 2 input prohibition error. The operand 2 is used in the step where use of the operand 2 is prohibited.
9CE	Inputting Oprnd is not allowed (Oprnd3)	Operand 3 input prohibition error. The operand 3 is used in the step where use of the operand 3 is prohibited.
9CF	Operand1 is invalid	Operand 1 data error. An invalid data is input for the operand 1. Check the data.
9D0	Operand2 is invalid	Operand 2 data error. An invalid data is input for the operand 2. Check the data.
9D1	Operand3 is invalid	Operand 3 data error. An invalid data is input for the operand 3. Check the data.
9D2	Inputted Operand is out of range (Oprnd1)	Operand 1 input out-of-range error. A value out of the allowable input range is input for the operand 1.
9D3	Inputted Operand is out of range (Oprnd2)	Operand 2 input out-of-range error. A value out of the allowable input range is input for the operand 2.
9D4	Inputted Operand is out of range (Oprnd3)	Operand 3 input out-of-range error. A value out of the allowable input range is input for the operand 3.
9D5	Undefined symbol (Oprnd1)	Operand 1 undefined symbol use error. An undefined symbol is used for the operand 1.

9D6	Undefined symbol (Oprnd2)	Operand 2 undefined symbol use error. An undefined symbol is used for the operand 2.
9D7	Undefined symbol (Oprnd3)	Operand 3 undefined symbol use error. An undefined symbol is used for the operand 3.
9D8	Symbol type error (Oprnd1)	Operand 1 symbol type error. A symbol of the type not allowable for the operand 1 or outside of the scope is used.
9D9	Symbol type error (Oprnd2)	Operand 2 symbol type error. A symbol of the type not allowable for the operand 2 or outside of the scope is used.
9DA	Symbol type error (Oprnd3)	Operand 3 symbol type error. A symbol of the type not allowable for the operand 3 or outside of the scope is used.
9DB	Symbol type error (Input Condition)	Input-condition symbol type error. A symbol of the type not allowable for the input condition or outside of the scope is used.
9DC	Invalid Symbol String	Symbol string error. An invalid character is used at the head of the symbol or in the character string.
9DD	Multiple declaration of a Symbol	Symbol multiple declaration error. The same symbol has multiple definitions.
9DE	Symbol value not inputted	Symbol value no input error. No symbol-defined value is input.
9E0	Servo OFF while in Action	Servo OFF while in action. An action command is given to the axis with the servo OFF. Turn on the servo first.
9E1	Not yet Homed MOVE	Movement/continuous movement prohibition error at not-yet-homed time. Complete homing first.
9E2	Not yet Homed TEACH	Teaching prohibition error at not-yet-homed time. Complete homing first.
9E3	Function not Supported	Unsupported function error. An unsupported function is attempted to execute.
9E4	Encoder type error	Encoder type error. Check the ABS/INC type (each-axis parameter No. 38) of the operation target axis.
9E5	Axis number error	Axis No. error. The specification of the axis No. is invalid.
9E6	No effective axis	No effective axis error. There is no effective axis that can be edited and operated. Check the effective axis pattern (all-axis common parameter No. 1).
9E7	EEPROM write error (1)	EEPROM write error.
9E8	EEPROM write error (3)	EEPROM write error.
9E9	EEPROM read error (4)	EEPROM read error.
9EA	EEPROM read error (5)	EEPROM read error.
9EB	Password error	Password error. The password is invalid.
9EC	Position Data has been changed.	Movement/continuous movement prohibition error at position data change time. After writing the changed data in the controller, make a reattempt.

9ED	Can not edit while running program (TP)	Program edit prohibition error while running. Editing operation cannot be performed for the running program. Exit from the program first.
9EE	Too many Symbol Definitions	Excessive number of symbol definitions.
9EF	Can not reset M-Dat when servo is ON.	Absolute encoder multi-rotation data reset prohibition error at servo ON time.
DE0	Receive Data Invalid	Received data string error (TP). The received data has an error. When it is not eliminated even through re-connection, contact the manufacturer.
DE1	Header Logic Error (IAI Protocol Send)	IAI protocol send data header logic error
DE2	Command ID Logic Err (IAI Protocol Send)	IAI protocol send data command ID logic error
DE3	Receive Data Error (IAI Protocol Recv)	IAI protocol receive data error
DE4	Response Time-out (IAI Protocol Recv)	IAI protocol response time-out error
DE5	Overrun Error (Master Mode)	Overrun error (in Master mode)
DE6	Framing Error (Master Mode)	Framing error (in Master mode)
DE7	Parity Error (Master Mode)	Parity error (in Master mode)
DE8	Send Que Overflow (Master Mode)	SCI send queue overflow (in Master mode)
DE9	Receive Que Overflow (Master Mode)	SCI receive queue overflow (in Master mode)
DEA	Send Buffer Overflow (IAI Protocol Send)	IAI protocol send buffer overflow
DEB	Receive Buffer Overflow (Master Mode)	IAI protocol receive buffer overflow (in Master mode)
DEC	Send Que Overflow (IAI Protocol Send)	IAI protocol send queue overflow
DED	Receive Que Overflow (IAI Protocol Recv)	IAI protocol receive queue overflow

DEE	CTL Not Connected	Controller no connection error. Communications cannot be established or an unsupported controller is connected. The probable causes are as follows: ① It is a communication failure due to a break in or noise from the communication line. ② The communication baud rate of the controller is not supported by the teaching pendant. (The failure may be resolved by the controller power reconnection.) ③ The model not supported by the teaching pendant is connected. (Refer to Support Models.)
DEF	Emergency Stop	The EMERGENCY STOP button of the teaching pendant is pressed.
DF0	Non-supported CTL is connected	Non-supported controller is connected.

MEMO

MEMO

MEMO

MEMO

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